S. HRG. 101-986, PT. 6

# DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1991

## HEARINGS

BEFORE THE

## COMMITTEE ON ARMED SERVICES
## UNITED STATES SENATE

ONE HUNDRED FIRST CONGRESS

SECOND SESSION

ON

**S. 2884**

AUTHORIZING APPROPRIATIONS FOR FISCAL YEAR 1991 FOR MILITARY ACTIVITIES OF THE DEPARTMENT OF DEFENSE, FOR MILITARY CONSTRUCTION, AND FOR DEFENSE ACTIVITIES OF THE DEPARTMENT OF ENERGY, TO PRESCRIBE PERSONNEL STRENGTHS FOR SUCH FISCAL YEAR FOR THE ARMED FORCES AND FOR OTHER PURPOSES

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**PART 6**

**DEFENSE INDUSTRY AND TECHNOLOGY**

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MARCH 28; APRIL 2, 24, 30; MAY 4, 7, 14, 21, 23; JUNE 12, 13, 1990

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# DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1991

WEDNESDAY, MARCH 28, 1990

U.S. SENATE,
SUBCOMMITTEE ON DEFENSE INDUSTRY AND TECHNOLOGY,
COMMITTEE ON ARMED SERVICES,
*Washington, DC.*

## DEFENSE TECHNOLOGY STRATEGY AND THE DEFENSE CRITICAL TECHNOLOGY PLAN

The subcommittee met, pursuant to notice, at 9:30 a.m., in room SR-222, Russell Senate Office Building, Senator Jeff Bingaman (chairman of the subcommittee) presiding.

Committee members present: Senators Bingaman and Wallop.

Professional staff members present: Richard D. Finn, Jr., David S. Lyles, and William H. Smith.

Minority staff members present: Romie L. Brownlee, deputy staff director for the minority; Jonathan L. Etherton and John E. Mansfield, professional staff members.

Staff assistants present: Elizabeth Ann Harlow and Melissa Ann Ramsey.

Committee members' assistants present: Edward M. McGaffigan, Jr., assistant to Senator Bingaman; John Gerhart, assistant to Senator Bingaman; Melvin G. Dubee, assistant to Senator Byrd; Lee W. Whittaker, assistant to Senator Wallop; Charles G. Pearcy, assistant to Senator Lott; and Eric H. Thoemmes, assistant to Senator Coats.

### OPENING STATEMENT OF SENATOR JEFF BINGAMAN, CHAIRMAN

Senator BINGAMAN. The subcommittee meets this morning to receive testimony on two closely-related issues. The first issue is the implication of the dramatic changes that have occurred and continue to occur in Europe, the Soviet Union and the Far East for our Nation's defense technology and industrial base policies. One of the major challenges facing this Nation in the coming years will be adjusting our technology strategy to those major events.

How are we to make a successful transition from the old bipolar Cold War era to a much more complex new era of diverse and uncertain threats and of intense economic competition with our principal allies, the European Community and Japan?

As Chairman Nunn has repeatedly pointed out, the entire U.S. national security strategy requires a reexamination as the near-term threat in Eastern Europe and the Soviet Union recedes with

the inevitable accompanying cuts in defense spending for us and our allies. Even as this takes place, we are witnessing an increase in the capabilities of the so-called Third World nations as they modernize their military forces with weapons that are in many cases almost as capable as those of the Warsaw Pact countries.

Is the role of technology in our national security strategy as important in the future as it has been in the past? I believe that it is, and we will be discussing that in detail with our first panel.

The second issue before us this morning is associated with the creation of a coherent strategy or vision that will guide the development of our defense and dual-use technology in a way that will achieve a maximum return on the limited investments that we are able to afford. This is the subject of the second panel.

The Defense Critical Technology Plan, now prepared annually by the Department of Defense and the Department of Energy, grew out of an awareness on the part of this committee that DOD was not adequately managing its long-term research and technology investment. The Defense Critical Technology Plan was envisioned to provide a clear outline of future goals as well as a guide on how to achieve them. The second annual plan was delivered to Congress one week ago today. It represents a substantial improvement over the first plan, but I believe there is still room for improvement, and we will explore that as we have that plan presented to us.

We continue to hope that the plan will become a foundation upon which the administration and Congress can agree on a common national technology vision and road map for achieving it. We expect a similar plan on emerging civilian technologies from the Commerce Department this coming November. The President's science adviser will submit a national critical technologies report outlining the 30 technologies most important from both a national security and economic competitiveness perspective.

This morning we have four highly qualified witnesses testifying in two panels. The first panel is composed of Dr. Fred Ikle and Dr. Hans Mark. They will testify on the broad issue of making our defense technology policy fit today's and tomorrow's national security challenges.

Dr. Ikle has held many important positions in both the private and public sectors. His most recent position in Government was Under Secretary of Defense for Policy. He was also Co-Chairman of the Commission on Integrated Long-Term Strategy. This commission was chartered 2 years ago to look into the future and recommend a national strategy to cope with that future. We will be eager to hear Dr. Ikle's comments on how the conclusions of the commission, especially in the area of research and technology, apply in today's global environment.

Dr. Hans Mark has also had extensive executive level service in Government, industry and academia. In Government he has served as Secretary of the Air Force and as Deputy Administrator of NASA. He was also the director of the NASA Ames Research Center, guiding research and technology activities in areas ranging from aerodynamics to spacecraft development. He is currently the Chancellor of the University of Texas System. He has held a variety of academic positions at several universities.

Following the testimony of Drs. Ikle and Mark, we will have a round of questions, and then we will hear from the second panel comprised of witnesses from the Defense and Energy Departments. Dr. Charles Herzfeld recently appeared before the Armed Services Committee at his confirmation hearing to be Director of Defense Research and Engineering. We welcome him back today in his first appearance before this committee in his new position. He is accompanied by his deputy, Dr. George Millburn, who was directly responsible for preparing this year's Critical Technology Plan. We have asked them to describe the Critical Technology Plan that we received last week and to answer questions regarding it.

Before the hearing, I asked DOD to respond to some additional questions, and those answers have been distributed here in the subcommittee. We will include those answers in the record.

The Department of Energy is represented this morning by Mr. Richard Hahn, who is the Director of the Office of Weapons Research, Development and Testing. In that position he manages the Department of Energy's nuclear weapons R&D program and also coordinates its SDI research activities. As such, he is well qualified to testify on this year's Critical Technology Plan.

We will go ahead with Dr. Ikle and then Dr. Mark. We very much appreciate their willingness to testify today. If you could go ahead and proceed in whatever way you like with your full testimony, or a summary thereof, or whatever you think is most appropriate.

## STATEMENT OF DR. FRED IKLE, FORMER UNDER SECRETARY OF DEFENSE FOR POLICY

Dr. IKLE. Thank you, Mr. Chairman. I am indeed honored to be here before your subcommittee. I shall summarize the remarks to leave more time for your questions.

Today it is your subcommittee that, indeed, has the most important responsibility in congressional oversight of our Nation's defense effort, because in this new geostrategic era, preparing for an imminent danger of large-scale warfare has become a lesser priority. So, if I might say so, the other subcommittees of the Armed Services Committee deal with reductions and contraction. Not so for your subcommittee, Mr. Chairman. The critical investments for our Nation's security are those that will maintain and advance America's technological and industrial capacity so that our Nation can respond in the event of a future international emergency.

Now this does not mean that we should institute what is sometimes called an industrial policy; that is to say, an attempt by the Government to promote this or that industry and to influence the allocation of industrial investment. Anyone who thinks that is a good idea should visit the industries in Rumania or Poland or East Germany.

Still, we have these pressures. I remember when I served in the Pentagon I was often approached, Mr. Chairman, by representatives of industry—steel, shipbuilding, ballbearings—who wanted Defense Department support in the form of protectionist measures or direct subsidies. Our experience has been that only in very rare circumstances is that the right answer.

A frequent justification for these protectionist approaches has been the dependence of our defense industry on foreign sources. I believe over the last 6 years or so we have developed a more rational approach to that problem, realizing that it is not the dependence on foreign sources, per se, but how diversified these foreign sources are and where they are located.

You may want to get into further questions on this particular subject in the question period.

Let me take the remaining minutes of my opening remarks to focus on what I think is a key issue, the relationship between strategy and future defense technology. I think the report on critical technology, the Critical Technology Plan that we will be discussing later this morning, is a fine starting point here. You did the right thing in authoring the legislation for this report, because it forces the Pentagon to review the cutting edge of technology and to examine the support and management that it devotes to these technologies.

The plan is necessarily shaped, however, by today's strategic concepts or, indeed, given this rapidly changing world, by yesterday's strategic concepts. Now we find that yesterday's threats are rather unconvincing. You noted yourself recently, Mr. Chairman, that the near term operational readiness will be less important than the need to continue ensuring maximum U.S. long-range defense potential in the event that the world situation takes a turn for the worse. That is your quote, and I totally agree.

The driving concern now, as I indicated before, is for the future: to have defense technology that gives us the potential, years into the future, to respond to a new deterioration, a new threat. Let us remember here that it takes 10 years to develop new technology for military application and perhaps another 10 years or more to field the military systems. So we are looking at the year 2010. Obviously, we cannot rely upon the customary planning process in the Pentagon to provide for change that far ahead.

The Bipartisan Commission on Integrated Long-Term Strategy to which you referred, Senator, did point out that there is a problem here. There is a dearth of the Pentagon-sponsored projects that incorporate both new technologies and new military operations. The traditional process of generating what is called "requirements" by the services for R&D and for acquisition, begins with an identified military mission, and that mission, more likely than not, addresses threats that had been identified in prior years, not threats or opportunities 10 years hence.

So the forward planning based upon such a backward view is bad enough in a period of stability when the alignment of friend and foe is unchanged, but it is clearly inadequate for the present era.

Given the current political outlook, we want to apply what I would call "the Bingaman Principle;" that is to say, to preserve the potential for strengthening our forces. To this end, I think the Pentagon can make several efforts.

First, it will have to take an increasing interest in the technological evolution that goes on outside the defense industries, outside the Government's weapons laboratories, outside the military contractors. The resources in the commercial world here in the United

States and abroad will by far overshadow the science and technology resources in the Pentagon.

In the Pentagon a few years ago they initiated a good effort to make greater use of commercially available products, but that effort had another purpose. It was to save money by purchasing simple supplies in the commercial market that did not need specific, separate military specifications.

I think in the future we should try to expand and push this idea of relying on commercial things as far as possible not only for the cost savings that we had in mind when we started this a few years, ago but also to broaden the production base. In a new emergency the Government could divert existing civilian production to defense. That is what we did at the beginning of World War II. We could do that much faster than we could build new defense plants.

There are other steps that can be taken to strengthen the U.S. capability for coping with a possible deterioration in the security environment. For example, equipment produced for wartime obviously does not require the long shelf life of peacetime stocks. Here again, Pentagon planners have already identified items that could be produced at lesser cost and in short time by cutting down the peacetime durability requirement. Clearly, in an emergency that requirement can be set side.

Dr. Hans Mark, in one of his contributions to that strategy commission, has in fact suggested that we would do well with this approach even for certain types of aircraft. Again, here you want to be prepared and have this thought out beforehand.

Next, to take advantage of technological innovations, the military services frequently have to retrofit, or modify, their major systems, what we call "platforms"—ships, aircraft, tanks. These things take a long time to build, and by adding new subsystems based on the latest technology you can improve your capability more quickly than by building new ships and aircraft.

So in a period that we are now entering with fewer aircraft, less ship construction, and so forth, it is all the more important that these slow-to-build items be designed beforehand so as to permit quick upgrading with the addition of new armaments, new avionics, new sensors, et cetera. In fact, Dr. Charles Herzfeld recommended such "modularity" between platforms and subsystems for precisely this purpose in his report for the strategy commission.

Now if we are indeed entering a peaceful period with shrinking defense budgets, we also must expect a widening gap between existing military capabilities among the various industrial nations, on the one hand, and the potential for new weaponry that is inherent in the advancing state of science and technology, on the other hand.

In the long period of peace, the kind of future that we hope for, this gap will become of ever-increasing strategic importance. It means that at some future date an industrialized nation bent on new military expansion could build potent new weapons based on these new technologies in a relatively short time. And in such a peacetime period not all new technologies that could have military applications are likely to be exploited for military ends by the United States or our allies.

So a new dictator in control of an industrialized country by contrast could then order a crash program to take advantage of the science and technology that is inherent in the developments that have been going on over the last 10 or 20 years but which have not been brought to bear on military things by our Pentagon or by our allies' defense ministries.

I think this leads to an important conclusion, Mr. Chairman. We will need a separate continuing monitoring effort to understand the military potential of new technology to which we are not devoting Pentagon R&D and testing efforts, so that we can be prepared to respond, not necessarily in kind should an enemy use all these things, but to respond so as to defend our country in case such new threats should suddenly materialize.

Thank you, Mr. Chairman.

[The prepared statement of Dr. Ikle follows:]

PREPARED STATEMENT

BY THE HONORABLE FRED C. IKLÉ

Mr. Chairman, I am honored to testify here. Today, the most important responsibility for Congressional oversight of our nation's defense effort resides in your Subcommittee, Mr. Chairman. In this new geo-strategic era, preparing for an imminent danger of large-scale warfare has become a lesser priority. Other Armed Services subcommittees in charge of conventional forces, personnel, readiness and sustainability, and strategic forces -- now have the responsibility to approve reductions in our forces, either in anticipation or pursuant to arms agreement, or as a way of taking advantage of the reduced threat in Europe.

Not so for your sub-committee, Mr. Chairman. The critical investments for our nation's security are now those that will maintain and advance America's technological and industrial capacity, so that our nation could respond to a future deterioration in the world situation and could marshall the strength to deter newly emerging threats.

This does not mean, however, that the Defense Department or this committee should institute what is sometimes called an "industrial policy" -- an attempt by the government to promote this or and that industry and to influence the allocation of industrial investments across the board. Anyone who thinks that pervasive government planning for industry would be a good idea should visit the industries in Romania, Poland, or East Germany. Yet, when I served in the Pentagon, I was often approached by

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Dr. Iklé, Undersecretary of Defense 1981-88, is now a Distinguished Scholar, Center for Strategic & International Studies.

representatives of industry -- steel, ball-bearings, shipbuilding -- who wanted Defense Department support in the form of protectionist measures or direct subsidies. Only in very rare cases is such intervention justified.

A frequent justification for protectionist industrial policies is the concern, or alleged concern, of our defense production becoming overly dependent on foreign imports. Over the last five years or so, the US government has developed a more rational and more sophisticated approach to this problem. The key criterion is not whether we depend on foreign imports, but how diversified these foreign sources are and where they are located.

To save time, I will not dwell further on this question of dependence on foreign sources. (Members of the Committee may want to return to this issue during the question period.) Instead, I want to focus now on the relationship between strategy and future defense technology.

There could be no better starting base for addressing this question than the Defense Department's new Critical Technology Plan. You did the right thing, Mr. Chairman, in authoring the legislation that mandates this report. If forces the Pentagon to review the cutting edge of technology and to examine the support and management that it devotes to technologies critical for defense. The Critical Technology Plan, however, is necessarily shaped by today's strategic concepts -- or, in the rapidly changing world that we face, it may be even yesterday's strategic concepts that exercise the strongest influence on the selection and promotion of technologies for defense.

Given the current historic developments, many of yesterday's

military threats seem unconvincing. As you wrote recently, Mr. Chairman, "near-term operational readiness will be less important than the need to continue ensuring maximum U.S. long-range defense potential in the event that the world situation takes a turn for the worse."* I totally agree. The driving concern now of our long-term strategic planning, and hence for our future defense technology, must be to maintain this potential many years into the future for the event that the world environment should confront us with major new military threats.

Given that it takes some ten years to develop a new technology for military application, and perhaps another ten years to field a military system, we are looking essentially at the year 2010. We cannot rely on the customary planning process in the Pentagon to provide for or to anticipate change that far ahead. The years ago, the bipartisan Commission on Integrated Long-Term Strategy pointed this problem out: there is a dearth of Pentagon-sponsored projects that incorporate both new technologies and new military operations. The formal process of generating service "requirements" for R & D and for acquisition begins with an identified military "mission". That "mission", more likely than not, addresses threats that had been identified in prior years, not threats and opportunities ten years hence.

Forward planning based on such a backward view is bad enough in a period of stability, when the alignment of friend and foe remains unchanged. It is clearly inadequate for the present era. New technologies make possible new military missions and may render old missions obsolete. Likewise, political changes will call for new missions and may make old missions unimportant. The process for selecting technologies to be tested and further

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* Senator Jeff Bingaman, "Congressional Perspective, Key to Defense Efforts", Signal (February 1990)

developed must be kept open to accommodate new strategic concepts and new policy objectives. Versatility and flexibility are bound to be more important attributes of our future weapon systems than the specific, so-called "missions" that date largely from the 1980's or from earlier decades.

If current trends in Eastern Europe and the Soviet Union continue, our defense budget is likely to shrink further. Also arms control agreements may enhance our sense of security and bring additional reductions in forces. Given this outlook, the central purpose of our defense policy must be to preserve the potential for strengthening our forces again in the event of a global deterioration -- what I would call the "Bingaman Principle", thinking of the Senator's point that I quoted before.

To this end, the Pentagon will have to take an increasing interest in the technological evolution that goes on outside of defense industries, outside the government's weapons laboratories, and outside military contractors. The resources in the commercial world, here in the United States and abroad, will by far overshadow the science and technology resources of the Pentagon.

A few years ago, the Pentagon initiated a purposeful effort to make greater use of commercially available products. The objective was to save money by purchasing supplies and equipment in the commercial market whenever separate military specifications were not essential. In the future, I believe, this idea should be pushed as far as feasible, not only for cost savings, but also to broaden the production base. In an emergency, the government can divert existing civilian production to defense faster than it could build new defense plants.

Other steps can be taken to strengthen the US capability for coping with a possible deterioration in the security environment. For example, equipment produced for wartime obviously does not require the long shelf-life of peacetime stocks. Pentagon planners have already identified items that could be produced more quickly and more cheaply if the requirement for peacetime durability could be dropped. Dr. Hans Mark has suggested that we would do well with this approach even for certain types of military aircraft.*

To take advantage of technological innovations, the military services frequently have to retrofit or modify their major "platforms" -- the ships, aircraft, tanks. These platforms take a long time to build and are hard to mass-produce in an emergency. By adding new subsystems based on the latest technology, our military capability can be improved more quickly than by building new platforms. In the era we are now entering, the Pentagon will build fewer ships, aircraft, and tanks. All the more important that these slow-to-build items be designed so as to permit quick upgrading through the addition of new armaments, avionics, or new sensors. In fact, Dr. Charles Herzfeld recommended such "modularity" between platforms and subsystems in his technology report last year that he prepared for the Commission on Integrated Long-Term Strategy.**

If we are indeed entering a peaceful period with shrinking defense budgets, we should expect a widening gap between existing military capabilities, on the one hand, and the potential for new

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*In Technology for National Security, report of the Working Group on Technology, Commission on Integrated Long-Term Strategy (1988) pp. 129-30.

** Ibid. pp. 60-61

weaponry inherent in the advancing state of science and technology, on the other hand. In a long period of peace -- the kind of future that we hope for -- this gap will become of increasing strategic importance. It means that at some future date, an industrialized nation bent on new military expansion could build potent new weapons, based on new technologies, in a short time. In a peacetime period new technologies are likely to be developed that could have various important military applications that the United States and other industrialized democracies will not want to exploit. A new dictator, by contrast, could order a crash effort to take advantage of such possibilities.

Mr. Chairman, this leads to the conclusion that the United States will need a continuing monitoring effort to understand the military potential of new technology. We need not be prepared to respond in kind to each new technological threat. But we will have to anticipate and prepare so that we could defend or protect our country, should these new threats materialize.

Senator BINGAMAN. Thank you very much. Before we hear from Dr. Mark, let me defer to Senator Wallop, for any opening statement he would like to make.

Senator WALLOP. No, Mr. Chairman. I would prefer to hear from Dr. Mark and the panel. I will submit my statement for the record.

[The prepared statement of Senator Malcolm Wallop follows:]

PREPARED STATEMENT OF SENATOR MALCOLM WALLOP

Mr. Chairman, it was the apparent lack of coordination 2 years ago among the various research activities in the Department of Defense and the Department of Energy which led to the requirement to prepare an annual Critical Technologies Plan. I am pleased to join you in welcoming our witnesses this morning. It is my understanding that we will be receiving testimony on approaches to a defense technology strategy as well as on the specifics of the Critical Technologies Plan submitted to us on March 15.

During this period of transformation in the national security environment, the Defense Industry and Technology Subcommittee has an important role to play in charting a long-term course for technology research. With the concentration of oversight of technology base projects and Government laboratory management within the subcommittee, it is incumbent on us to embed our decisions in the broader development of economic and foreign policy. The testimony of Doctors Mark and Ikle should provide us with some useful perspectives in that regard.

Developing a strategy for the development and exploitation of advanced, critical technologies will be a long-term, iterative process. As you have recognized Mr. Chairman, it has proven difficult to establish this focus in a designed to allocate resources for projects that may involve the use of many technologies. The Critical Technologies Plan that we have received this year has improved in many ways on the first plan sent to us last year. The information in the current plan is more detailed and has been presented in a clearer manner. I look forward to exploring ways for improving the plan further as well as for ensuring that the plan serves as a key document in our resource allocation decisions.

Senator BINGAMAN. All right. Dr. Mark, thank you for being here. We look forward to hearing your testimony.

## STATEMENT OF DR. HANS MARK, CHANCELLOR, THE UNIVERSITY OF TEXAS SYSTEM

Dr. MARK. Mr. Chairman and Senator Wallop, it is a great pleasure for me to be here today, to be back in Washington, to visit with old friends.

My name is Hans Mark. I am the Chancellor of the University of Texas System, and I am also a Professor of Aerospace Engineering at the University of Texas at Austin.

I have submitted formal testimony which I will not read. If I may, I would like to ruminate a little bit on the points that I made in that statement.

I should start out by saying it is a particular pleasure being here with Fred Ikle and Charlie Herzfeld, who are both old friends. Dr. Ikle in his testimony mentioned the Commission on Long Range Integrated Strategy. I was one of the Indians who participated in the work of that commission. I wrote a portion of the report that was submitted by Charlie Herzfeld, and I left 20 copies for you with Dr. Smith so that you can take a look at it.

[The report referred to is attached as Appendix.]

I also read the Defense Department's technology plan, and I find myself in general agreement with that plan. The plan really grew out of the work that Dr. Ikle and his commission did. There are very strong similarities between the priorities that another old friend, Dr. George Millburn, developed for the plan and what we

did 2 years ago for the Commission on Long-Range Integrated Strategy.

The reason I make that point, Senator, is that we are often accused of not having continuity in our planning. It is just not true. We do have continuity. We do have an overall look at it.

What particularly impressed me about the technology plan are really the things on page 3 and page 7 in the introduction. On page 3 you will find a list of military priorities, and I find myself in substantial agreement with these priorities.

I want to stress particularly the emphasis on strategic defense. I know this is a controversial matter, but this is exactly the kind of thing we ought to be doing in a period of peace, when we have the time to do the technology right and when we have the time to do the research and the development and the testing, which is very important. The fact that strategic defense appears on the list of priorities is something that I think is very, very important.

I also agree with the priorities on page 7. There is a list of priorities in the technology area. I might quarrel with one or two. I think the plan is a little over-optimistic on what can be done with parallel computer architecture. I still think we have a few problems before we really understand how to apply that particular concept to general purpose computing machines.

I think the plan perhaps underestimates the importance of biotechnology. I am prejudiced a little bit in this case. Our university has four big medical schools, and so I talk to a lot of people in that business, and so maybe I am biased on that point.

But if I were to make any change in that plan, I would switch those two things around. Parallel architecture appears in Group B of the priorities, and biotechnology in Group C, and I would suggest that we switch those two, because I think that is more like what I think is going to happen.

I think that the other part of this hearing, Mr. Chairman, if I am not mistaken, has to do with the interaction between national security and economic strength, and what we have to do to develop a strong economic position in the world.

We have not paid very much attention to that problem, because we have not had to. We have had the luxury, really, for half a century now, to be able to maintain the position of the world's leading industrial nation without working too hard at it, or without thinking too much about it. It has just kind of happened. We were the only nation at the end of World War II that was not devastated by that war, the only industrial nation that survived unscathed.

We still are the world's leading industrial nation. We still produce 25 percent of all the goods and services in the world, with 6 percent of the world's population, and that is really quite an achievement. But we have got some strong competition.

I think Japan is always mentioned as the major competitor. I would submit, Mr. Chairman, that starting in 1992 we are going to have another competitor on the other side of the world in Europe, when with a stroke of a pen the European Community will be created. The European Community consists of 12 nations with a total population of 350 million, and if the East Germans and the Czechs and the Hungarians—and I think those three are candidates to become members of that economic union—if you add those you

have about 400 million people. That is almost twice—well, a little less than twice the population of the United States and three times the population of Japan.

These nations have a modern industrial plant. If you put it all together it is about 25 percent bigger than the U.S. industrial plant. They have a disciplined work force, disciplined and educated work force. If you think the Japanese are competitors, wait until those fellows get their act together. Wait until they abolish currency differences, trade barriers—all the things that have prevented them from reaching that point.

It is at this point, Mr. Chairman, that I would respectfully disagree just a little bit with my good friend Fred Ikle. I know there has been a lot of debate about the question of an industrial policy for this Nation, and whether we ought to have one. The fact is, we do have one. It has not been articulated. It is segmented for different industries. But if you look at each industry, you will find there are certain principles that govern what the Federal Government does for that industry, what the private sector does, what the consumers do, and that really in essence is an industrial policy.

I think that confusion exists here in the definition of "industrial policy." Dr. Ikle mentioned some examples, Poland and Romania and the Soviet Union I guess and a few others, where they have an industrial policy which is stated. Their industrial policy does not work, and it does not work because they try to use an authoritarian mechanism, if you will, to make market judgments, and that just does not work. You cannot legislate how many shoes people are going to buy, or how many apples you ought to grow. These are market judgments.

On the other hand, governments can and do—and have done very well in the past—make judgments with respect to what basic human knowledge ought to be found, what research ought to be done, and what generic technology development sought to be undertaken.

I want to make a very clear distinction here, and I will go into detail on this shortly, between technology development and product development. The Government has to stay out of product development because nobody in the Government is as competent to make market judgments as people in the private sector. On the other hand, technology developments are often so expensive and so long term that only the Government is capable—or industrial consortia supported by the Government are capable—of making those long-term judgments. That is, after all, what the strategic plans that we have discussed, Mr. Chairman, are all about.

Let me give you an example of a particularly successful American industry. There is an American manufacturing industry that last year brought in a total of $19 billion in foreign exchange; that is a positive balance of trade of $19 billion. That industry has had a positive balance of trade year in and year out, ever since it was founded.

You might ask, why does this happen? Why is it that this industry succeeds and others have not? I am speaking, of course, of the American aeronautical industry, and you all know this. You can go to any airport in the world. You can see airplanes with the flags of all nations painted on the tails, and 85 percent of those airplanes

are built in Seattle, or in Los Angeles, or in Wichita, and they are built by American workers, designed by American engineers, et cetera, et cetera, and so on.

What is the industrial policy that has made the aircraft industry succeed where others have perhaps fallen by the wayside? First, Mr. Chairman, is the question of technology development. The Government through NASA and its predecessor agency, the National Advisory Committee for Aeronautics, has for 75 years now, ever since 1915, consistently supported technology development in aviation.

The word "consistent" is important here. We do not have a debate every year as to whether the Government ought to do that or not. We do not waste a lot of time on it, and every year, today the Government puts in between the Air Force and NASA probably $2 billion a year, developing generic technology for aviation.

It is that technology which is sold when foreigners buy American airplanes and which brings in that $19 billion of foreign exchange. Not a bad exchange for your investment. By the way, about three-quarters of that $19 billion is for civil aircraft—I am sorry, two-thirds is for civil and one-third is for military.

Now, a second point of the industrial policy that we have followed in aviation is that there is a transparent mechanism for the transfer of the technology that is developed in Government laboratories to the industry, and that mechanism has to do with a very close collaboration between the aviation industry and the Federal Government agencies working in that business.

I spent 9 years running a NASA laboratory, and I cannot remember a single day of those 9 years when we did not have 20 industrial contractors in the place, doing their thing in our facilities.

Third, and most important, I think, in terms of the product development is the adversarial relationship that exists between the Government and industry in many areas and this is fortunately not present in the aviation industry. For Example, the Federal Government broke up AT&T. Now, not only do the telephones not work, but one of the world's leading technology development organizations in communications, the Bell Labs, is slowly decaying.

That was a terrible mistake, and it was made because we did not have, in fact, what I would call an industrial policy in that sector. We spent some years trying to break up IBM and then the Government thought better of it. Fortunately, nobody has tried to break up Boeing, and so that adversarial relationship that exists in other sectors is not present.

Let me wind up, Mr. Chairman, if I may, by being as precise as I can about this difference where the Government stops and the private sector begins, in defining the difference between technology development and product development.

I was in Japan about 2 months ago. There are two domestic airlines in Japan, JAL and ANA. One of them flies European-built Air Buses and the other one flies Boeing 767s and 757s. I was told, because I am in that business, that the Boeing airplanes are clearly better than the Air Buses for the purposes for which they were bought.

Now, why is that? The essential difference between the Boeing and the Air Bus airplanes that are flown in Japan is that the

Boeing airplanes have what we call super critical wings, super critical air foils.

The super critical wing is an aerodynamic shape that permits a little more efficient flight by about 4 or 5 percent. It is not very big, but if you are running an airline with a very high volume that makes all the difference in the world in terms of calculating your direct operating costs and your load factors and finally your profits.

It means that you can either fly the airplanes 5 percent faster with the same fuel, or you can fly them at the same speed for 5 percent less fuel. That is basically what it comes down to.

Super critical air foils were developed in NASA laboratories in the 1960s. I remember when I first saw them at the NASA Langley Research Center at that time. It is generic technology. NASA put that on the shelf. We did not go out to the industry and say, okay, you have got to do this. We did not legislate products that had to carry those air foils. Boeing voluntarily picked it up on a new generation of airplanes that they started to build in the 1970s, the mid to late 1970s. Namely, the airplanes we now call the Boeing 757 and the 767.

That is the point I am trying to make, that we need to learn how to do generic technology development in a number of industries that depend on new technology. Many industries do not, but some do. We need to have consistent Government support. We do not need to get into this debate every year as to whether we ought to zero something out. I mean, that is really counterproductive. Then we need to make absolutely certain that the Government stays out of the business of product development.

I mean, let me give you an example. High definition television has attracted a lot of attention. Now, we developed the technology for that years ago. In fact, I remember when I was Secretary of the Air Force signing the papers for it and building the displays that we use in the fighter aircraft for the cockpit systems. That was generic technology that had a defense application and it was useful.

Whether or not to go into high definition television is a market judgment. It is not something the Government ought to do. The Government is not capable of judging whether that market is ready for exploitation or not. That is something that the private sector needs to do. They need to look at international competition and all these things, but that would be another example of the difference between the two.

We in Texas are very mindful of all of this, and we have encouraged in the last 6 years since I have been there the development of two industrial consortia with the purpose in mind of cooperating in the development of generic technology and then turning that technology over to the private sector for product development.

I am speaking here, of course, of the MCC, the Microelectronics Computer Corporation, which was started in 1984, and Sematech, which was started in 1988. These are both fairly large operations now. Both had the same objectives in rather different fields, and the point is that by sitting next to the university, taking advantage of the best minds that we can develop, we can put technology on the shelf that the industry can pick up with great efficiency, using the same model that I described in the aviation industry. In fact, in

the case of MCC there are already generic software packages out on the open market, being marketed by the members of that consortium, and so it is making money already.

Mr. Chairman, it has been a pleasure for me to be here and to have the opportunity to say a few words, and I would be very pleased to answer any questions.

Thank you very much.

[The prepared statement of Dr. Mark follows:]

Statement by Hans Mark

Chancellor

The University of Texas System

On January 18, 1980, more than ten years ago, I was asked to speak at a meeting of the Commonwealth Club of California in San Francisco. At the time, I was Secretary of the Air Force and the Carter Administration was just beginning to struggle with the problems that would ultimately cause its defeat. The Iranian "students" had captured 52 Americans in the U.S. Embassy in Teheran which they were to hold hostage for more than a year. The Russians had sent their armored columns across the frontier to Afghanistan only three weeks before my speaking date. I thought it would be a good opportunity to outline the challenges we were facing and to make some suggestions about what should be done.

I took as my theme, something that Prime Minister Margaret Thatcher of Great Britain had said a few weeks earlier. She had spoken of the imperial ambitions of Soviet Russia and warned that these would somehow have to be frustrated. She mentioned the invasion of Afghanistan and listed Russian military adventures elsewhere in the world. The Prime Minister went on to urge resistance to these threats and called for a steadfast response from her NATO allies. She wound up her speech by saying that the 1980's would be a "dangerous decade" but that if we stood firm, the threat from Soviet Russian military adventurism would recede.

A good case can be made for the argument that President Reagan during his eight years in office, met the threat that Margaret Thatcher defined early in 1980 and turned it back. He was not afraid to take some military risks and in the case of Afghanistan, the arming of the Mujahedin with high technology antiaircraft weapons was the decisive

move that finally caused the Russians to pull out. It is quite probable that the succession of Mikhail Gorbachev to the leadership of the Soviet Union would not have happened without the firm stand opposing Soviet Russian imperial ambitions adopted by President Reagan. Had Russian military adventures in Afghanistan and elsewhere in the world met with success, it might have been possible for the Russians to postpone the difficult task of implementing "glasnost" and "perestroika" for another decade. As it happened however, the policy of military aggression that they had pursued failed and this gave the opening to people such as Gorbachev to seize power and to start the long overdue restructuring of political life in the Soviet Union.

Where are we now ten years later? It is appropriate for me to once again start with something that Margaret Thatcher said last year, which has by now become a common theme. She said that the Cold War, as we have known it for more than forty years is over and that a new relationship between the world's major nations would have to be developed. I agree with her. The Cold War is over, but she should also have said that we have won. This is really the important piece of news which needs to be emphasized. The significance of "glasnost" and "perestroika" is that the leaders of the Soviet Union are abandoning Marxism. Furthermore, and this may be equally important, they have recognized that military aggression is not the way to do business. Gorbachev, in a speech at the United Nations a year ago, announced substantial withdrawals of Soviet armed forces from Eastern Europe and there is at least some reason to believe that some reductions have actually been implemented. Gorbachev has recognized that the military threat the Soviets are able to pose in Europe may no longer be as real as it once was, given their

concentration on internal problems. It is also obvious that their Warsaw Pact allies are no longer reliable. If the Russians were actually to invade Western Europe, what would the Poles do? Would they stand up and then shoot the Russian troops in the back as they crossed the boundary between East and West? Gorbachev and his friends must now ask themselves this question. The withdrawal of some Russian troops from Eastern Europe may simply be a recognition of this new reality. Under such circumstances it may not be possible (or necessary) to maintain the massive military presence that the Russians have maintained for over four decades in Eastern Europe.

The reduction of Soviet military threat in Europe will permit the United States to do something which a number of knowledgeable people, including Senator Sam Nunn, the Chairman of the Senate Armed Services Committee, have been proposing for some years. We can and we should withdraw perhaps half of the almost 400,000 troops we now maintain in Europe. I believe that this move is now a relatively safe thing to do and at the same time I believe it will encourage the Europeans to do more in their own defense. Furthermore, such a withdrawal could also lead to a substantial reduction of the U. S. defense budget which would assist in solving the major problem this nation has, mainly the size of its public debt.

So far I have concentrated on that part of the cold war that had to do with military posture. It is most important to recognize that the maintenance of a strong military depends on the strength of the economy that sustains it. Our real victory in the cold war has to do with economics. All over the world, collective economies are changing themselves over to market economies as fast as they can. In

large part, what we have called the cold war was a conflict between two very different ways of doing business: the way of private initiative, private enterprise, and the market economy on the one hand and the collective, Marxist, so-called "planned" economy on the other. Today, even the proponents of Marxist economic systems are rushing to modify their way of doing business to imitate ours. They have recognized that only by giving freedom to the human imagination can true prosperity be achieved. In addition, and this is really the important point, once economic freedom is established, political freedom must surely follow.

There are many who say that we Americans are incapable of making up our minds and incapable of following a long term policy. I believe that this is nonsense. For the last forty years, we have pursued an extremely successful foreign policy that has led to the positive results that I have just outlined. We started with the Marshall Plan in 1947 with the objective of helping both our wartime allies and our former enemies to recover from the effects of the war. This was a very far-sighted policy and by the early 1970's it was clearly successful. Both Europe and Japan had recovered and were in fact becoming successful commercial competitors. Another element of the policy was the containment of the military threat from Soviet Russia. This meant doing something the United States had never done before, which was (and is) the maintenance of a large peacetime military establishment. We did these things and by-and-large, the policy that we pursued consistently and in a steadfast manner has succeeded.

Now, having said all of that, the real question is: What about the future? The competition in the future is not going to be

between market economies and collective economies. It will be between different market economies. The nations of Europe who have been warring for a thousand years are about to unify themselves. In 1992, they will establish an economic union called the European Community. There is a good chance, in my opinion, that the political union of Europe will follow in the not too distant future. The next decade, therefore, will see the emergence of a third super power, a united Europe with a population of more than 350 million people and an industrial plant half again as big as ours. They are going to have a market economy and they will compete with us. Individual European nations have already competed successfully with us and they will become more effective once they unify. In the 1990's, Europe will become the world's most important economic super power and they will be much more dangerous competitors than the Japanese. The Japanese will not go away either, they have already been fierce economic competitors for over a decade and other Asian nations are following their examples.

We should welcome this competition. No one can be worse off in a world in which the major industrial super powers carry out a rivalry to see who can produce most efficiently those goods and services that all human beings demand for a high standard of living.

There are, however, real problems that we must understand and solve if we are to be successful in this new competition. While President Reagan correctly assessed the threat from Soviet Russia and made the right moves to deal with the problem, the same is not true in the economic area. While talking a good game, he essentially pursued the deeply flawed policies of his predecessors by

mortgaging our future beneath a mountain of debt, both public and private. President Reagan created an atmosphere which encouraged too many people to believe that there was no tomorrow. He compounded this folly by giving in to those people around him who believed that the government should stay completely out of business and let the free market work its will regardless of what others do. Free markets should obviously be our ultimate objective but free markets work only if all the other players in the world economy play by the same rules. Manifestly, they do not and it is this kind of thing that government must eventually fix by exerting pressure to persuade people that free market policies are in their own best interests.

Probably more important, President Reagan pursued social welfare policies that continued and expanded generous welfare benefits for a relatively affluent middle class while at the same time depriving the poorest and least able of our people of benefits that they had already been receiving. I am speaking here of health care programs and various other benefits, particularly military and civil service retirement programs, among other things, that are both expensive and that are aimed primarily at people who are essentially able to take care of themselves. These actions have created social divisions which I am afraid we will have to pay for heavily in the future.

Worst of all, education and the development of skills among our people that would enable us to compete successfully in the world economy have been neglected. By creating a political atmosphere which emphasized "feel good now" at the expense of investments in the future, President Reagan has condemned us to some years during which we will have to play "catch up ball." It is this atmosphere, for instance, that has created the corporate take-over binge which

yields quick bucks for a few people at the expense of our overall industrial competitive strength. By emphasizing finance rather than productivity we have neglected the training and education of people who can modernize, manage, and work our industrial plant.

These are all grave indictments. While President Reagan dealt successfully with the most serious foreign threat that we faced in the 1980's, he failed to strengthen the long term health of our economy and most important, neglected to provide the leadership to make it possible for the federal government to make the very important investments in the future that are necessary in order for us to prevail in the post "cold war" world.

What must be done to deal with the situation I have described? In order to restore our economic strength and to develop the necessary skills among our people, we have to reorganize our manufacturing industries and to strengthen our system of public education. For too many years now we have labored under the illusion that it is not important to build things in order to be successful economically. The "post industrial age," and the "service economy," were for too long misleading buzz words that influenced our policy makers. The truth is that you cannot have prosperity unless you make things that other people want. Flipping hamburgers at McDonald's is just not enough. Making things requires skills and discipline that are simply not characteristic of the much admired "service economy."

How shall we go about this task? Do we have any models that we could examine for guidance? Fortunately there is one that provides some really important lessons. It is an American manufacturing industry which has never experienced a negative balance of trade. Last year, we had a net positive balance of over $18 billion worth of exports of manufactured

products made by that industry. I am, of course, speaking of the American aeronautical industry. American airplanes make up eighty-five percent of the world's commercial fleet. You can go to any airport in the world and see aircraft with the flags of all the nations of the world painted on their tails. Yet, almost all of these airplanes are built in Seattle, in Los Angeles, and in Wichita. Why is this so? Why is it that we have been able to maintain a competitive edge in the aeronautics industry whereas we have lost it in others? I believe that it is really most important for us to understand why this is the case.

In my judgment there are three reasons why the American aeronautical industry has remained competitive.

(1) The federal government has made a consistent investment in the development of aeronautical technology for more than seventy years. This has been a long term program which was started in 1917 with the establishment of the laboratories of the National Advisory Committee for Aeronautics (NACA). Their work is now being continued by its successor agency the National Aeronautics and Space Administration (NASA). At the present time, we are investing between NASA and the military, about $2 billion per year in aeronautical research. This is a small investment when you consider the return.

(2) There is no adversarial relationship between the government and the aeronautical industry. This is extremely important. In other industries the federal government has attempted to break up the most successful corporations and has sometimes succeeded. Fortunately this has not been tried yet in the aeronautical industry, and we must guard against attempts to do so.

(3) There is good technology transfer from research and development to manufacturing in the aeronautical industry. This is also a consequence of the close relationship between the aeronautical contractors and the customer community, be it the federal government or the airlines.

What are we doing to understand how to apply the lessons of the aeronautical manufacturing industry to others? Unfortunately, not very much. The fact is that we have no coherent industrial policy. On the one hand, we support aeronautics and on the other hand, we destroy our position in electronics by decimating the best technology development center in that field in this country and probably in the world, the Bell Laboratories. This was the consequence of the break up of AT&T "monopoly." The government spent many years trying to break up another one of the most successful technology corporations in the United States, IBM, and then fortunately gave it up when the grave consequences of this action were recognized. Are we going to try to break up the Boeing Company as well with antitrust actions? I hope not. The jumble I have described is in part due to the Reagan Administration which was proud of the fact that it did not have an "industrial policy." This ridiculous attitude must change and it must change quickly.

In developing a new industrial organization, we must adopt an industrial policy which will permit us to perform the generic technology development for new products on a cooperative basis. I am very pleased to say that in this area The University of Texas System and also the political leadership in Texas have played a very active part. We have helped to develop and then to establish institutions in Texas working in the fields of electronics and

computers in which public, private, and university resources are mixed in such a way as to maximize the potential technology output. I am speaking here of the Microelectronics and Computer Technology Corporation (MCC), and of SEMATECH which are both located in Austin. Both of these institutions are consortia of private corporations which with government and university help are in the business of generic technology development. We have done this kind of thing successfully in the aeronautics industry and there is no reason why the same model cannot be applied to other industries as well.

Our great industrial corporations must still compete in product development to build those things that you and I buy from them, but in the process of developing new technology, they must learn how to cooperate. We can simply no longer afford to have the technology development process go on independently in a wide variety of different centers. It is too expensive and eventually it is counterproductive. That is what MCC and SEMATECH are all about and that is, of course, what the term "industrial policy" really means. There is nothing wrong with it, what is important is to choose the right one. I can guarantee that we will be left behind in this new competition unless we learn how to make cooperative technology development ventures of this kind work.

The hope is that the institutions of The University of Texas System in assisting the development of technology development centers of the kind I have described will be at the very center of the action in this new competition. Because of the presence of MCC, SEMATECH, and perhaps other organizations like them, all of us here who are members of The University of Texas System will have the opportunity to play a crucial role in the revitalization and reorganization of

the manufacturing industry in this country. There will be tangible benefits for all of us in terms of jobs and the diversification of the Texas economy. Hopefully, as the problems that face us because of the end of the "cold war" become more apparent, we will be more in demand than ever. However, the most important benefit will be the satisfaction of knowing that we in Texas are making a major contribution to the maintenance of the United States as the world's leading industrial power.

All of this is good stuff; however, I want to end on a note of caution. Everything I have said depends on maintaining a modicum of peace. We are assuming, for examples, that the people of Eastern Europe, the Czechs, the Poles, the Hungarians, the Russians and the other nationalities in the Soviet Union can manage the restructuring of their economic and political system without major bloodshed. I am not at all sure that this is possible. Major antagonisms that run very deep have been pent up in that part of the world for many years. It is for this reason that we must continue to maintain our military strength. It is quite possible that we may get drawn into conflicts in Europe and elsewhere because of the instabilities that will surround the breakup of the communist empire. These will be dangerous times, but I believe we have made progress in the last ten years. Even though the threat of instability and perhaps conventional conflict has increased, the threat of a catastrophic nuclear war between Soviet Russia and the United States has receded. To me this is the most important legacy that those who managed the world's affairs during Margaret Thatcher's "dangerous decade" of the 1980's have left to us.

Senator BINGAMAN. Thank you very much.

I will ask a few questions, then I am sure Senator Wallop will have some, as well.

Dr. Ikle, I would be interested in your general view about the failure that we seem to have integrating our support for research and development of technology in the defense area with our support for research and technology development in the civilian agencies.

One of the things we have struggled with here and we have put in place is an effort to begin to pull it together in a centralized place. Dr. Phillips is here. He is the designated Deputy Director for Industrial Technology at the Office of Science and Technology Policy (OSTP). We have tried to pull it together by directing or requesting that OSTP bring people together from defense and from some of the non-defense agencies, and get some coordinated view of what generic technologies we need to be concentrating on over a long period of time.

That does not seem to have happened, up until now, to my knowledge. Maybe it has happened and it is just not something that I am aware of. But I would be interested in any thoughts you have about whether this is an important thing to do, to what extent you think we can pursue the defense side of this, separate and apart from what we are doing in the civilian side? And anything you would have to say on that subject.

Dr. IKLE. Yes, Senator. Clearly, the defense side has to pursue the possibilities for military applications, as I mentioned in my opening remarks, of the evolving commercial technologies, because nobody else will do that.

And in some cases, you do have technologies which have only military applications. Nuclear explosives come to mind. An effort was made to give them civilian applications (peaceful nuclear explosives) but that was, I think, slightly,if I may use the word, fraudulent. The thing never made sense.

But there are a few areas like that. Dr. Mark mentioned the importance of bioengineering and biotechnology. In that area, military applications, to some extent, are things we do not want to do as part of our defense effort.

There are some special applications which fit into industrial development in a general sense, but we are excluded from our defense development effort, e.g., biological warfare. But nobody else may be watching that so we need to keep a watch over it.

Now, your central question beyond that is, to what extent could the Pentagon be more effective, the Defense Department, in sponsoring the kind of technology development Dr. Mark mentioned?

And I agree with his distinction, incidently, about the Government's useful role in technology development, to have a technology policy, to help industry, but not product development. Not an industrial policy in that latter sense.

And to some extent we just, I think, have been lucky to have a rich Defense Department in the 1950s and the 1960s that was interested in things for its own uses, which also had wide commercial use, for example aircraft.

In other areas, the Defense Department has played a leading supporting role, like in the computer area, but for reasons of a shrinking budget, has begun to back away from it.

I do not think there is an overall answer to the question, to what extent you can rely on the Pentagon. I would think in the period ahead of us it may be better not to count on Defense Department dollars to drive the sound industrial technology policy that Dr. Mark described, but to have a Government effort that can take a broader view, whether things are useful for military applications or not, they may deserve sponsoring.

And they also deserve sponsoring in a more steady and longer-term fashion than our fluctuating defense budget would make possible.

Senator BINGAMAN. Let me try to be specific on it, and maybe either one of you would want to comment on this.

We funded SEMATECH through the defense budget and authorized it in this committee, because that was the only way that we could get it done. People were concerned that we not pursue industrial policy.

Nobody wanted the Government to get in and help the private semiconductor industry compete in the civilian world. But if we could make it a defense need, fine, we could go ahead and commit $100 million a year for 5 years, which we have done.

I guess my thought after that episode was that it worked in that case. And I think that the arrangements worked well, and my understanding is that Bob Noyce is pleased with the arrangement that he has with the Department of Defense, and that there is no difficulty.

But I am afraid there may be some other areas of generic technology development, where the Government should be stepping in to assist, but we cannot make the claim that it relates to defense. Maybe biotechnology is such an area; I do not know. But we cannot make the claim very strongly that it is a central need of our defense effort, and therefore we are backing off and saying this is not something we can do. It is not proper.

I tend to think that we went through a little bit of an exercise in self-delusion by finally concluding that SEMATECH was worth doing because it was defense related. I think that Bob Noyce and most of the people in there would tell you that the main benefits of SEMATECH are not to the defense sector, although there are benefits there. The main benefits are to our commercial capability, the capability of our industry to remain competitive in world markets.

And we do have a defense benefit that results from that, but it is not the main driving force that justifies our involvement.

Do either of you have a comment on that particular issue? I would be anxious to hear it.

Dr. MARK. Mr. Chairman, I think you have hit a very important point here, because the rationale for Government involvement in something is generally a shifting one. It is for that reason that we have these debates every year.

Let me try to draw attention to two rationales that are accepted for Government involvement in technology development. Okay? Defense is clearly one.

Aside from defense, the regulatory authority of the Government does drive a good bit of technology development. In the aviation business, the Federal Aviation Administration has a budget for flight control systems developments and things of that kind. We used to work with them when I was in NASA.

FDA and other regulatory agencies have functions of protecting the public that have, over the years, justified Government involvement, and have, of course, produced technical spinoffs. That is, the flight control systems, for example, are a particular one. The ground control approach systems, really, all over the world, are American concepts.

The second area is public health. NIH, the Public Health Service, is one of our oldest Federal agencies. And going back to the wiping out of the malaria epidemic in Philadelphia. Yes, that did happen, there was malaria in Philadelphia a century ago.

So there is a technology development function there. Our medical schools in Texas probably have upwards of $200 million a year of NIH research money, which goes into various areas. And there are enormous spinoffs from that.

You have a biotechnology industry that comes from those research investments.

The sticking point is whether or not you can make the general principle—whether or not you can generalize this principle into what you might call the broad area of economic health. That is, can you make the argument that you ought to get into certain technology areas because of somebody's perceived economic potential far downstream?

I would submit that, while Dr. Ikle mentioned some unsuccessful examples of that kind of industrial policy, there are some successful ones, too. Japan is the outstanding example. Those guys sit down and they decide what technologies they are going to play with, or what technologies they will apply in products, and then go ahead and do the development.

I have a feeling that we are going to come to that same state. That is, we are going to have to invent a rationale which maintains the ability of the private industry to make the market judgments, but, at the same time, provides a reason for public investment in technologies that have future promise.

That seems to me to be the problem, and it is a political problem. It is really a problem of developing a political process and to have this debate and to come up with some kind of a reasonable conclusion.

Senator BINGAMAN. Thank you very much.

Senator Wallop.

Senator WALLOP. Thank you, Mr. Chairman.

Dr. Mark, let me pursue that a little more because, in many respects, one could make the case that the problems that we have in developing any kinds of technology are not that we do not follow the model of Japan, but that we have prohibited ourselves from doing it. And antitrust laws come immediately to mind.

And another area, which is not perhaps the subject and topic of this committee, is banking. We wonder why we do not have any of the world's 10 largest banks when we do everything in the world we can to keep banks small.

We sit and complain about the effects of what we specifically set out to do, and succeed at. So I get confused as to where we are going to go in this one.

Dr. MARK. I cannot disagree with a word you said. I think you are exactly right.

Senator WALLOP. And the problem is that modern American democracy is a very reactionary exercise. It reacts to stimuli almost on a daily basis.

And that brings me to a question that I would like each of you to address, and that is, assuming that there is some acceptability in the concepts that you expressed, namely that the Government's role is in the development of technology and not its commercial application, how do we stop—and let me add one more qualification, which is yours, that it be consistent—how do we create such a consistency when, in the political arena, this is basically going to be a game of winners and losers?

And I just take from your statement, in particular, or the example of California, a State that has large numbers of members in the House of Representatives. And that does not seem to me to be the way in which long-term policy is likely to be developed successfully. Long-term politics will be developed successfully, but policy is less likely.

Dr. MARK. I would submit, Senator, that we are capable, through this rather stochastic democratic process that you describe, of not only developing, but maintaining long-term policies.

All of us who have had anything to do with the Defense Department in the last 40 years recognize that the maintenance of a large military was something that the United States has never done before. I mean, the first time we did that in a sustained way in peacetime was after World War II.

There was a debate at the end of World War II as to whether we should do that. And you remember the policy was encapsulated in the word "containment." We were going to establish a military presence in the world that would permit us to contain military aggression by the Soviet Union and its allies.

And that, then, drove the Defense Department to the size that you now have. And we did that through the process of debate, through argument, and we consistently pursued that policy for 45 years.

Now, sure, you can argue on the edges, there were disagreements. And in a multi-hundred-billion-dollar defense budget, a few billion dollars do not, in my mind, mean a change in policy. I think that the overall policy has been consistently followed.

I believe, Senator, that we are perfectly capable of mounting this debate. In fact, your committee is doing it. These hearings are part of that debate. We are perfectly capable of mounting that debate and drawing the kind of conclusion that I believe could result in a successful industrial policy.

And I think I like Dr. Ikle's words better, successful industrial technology development policy. I think that is what you are really saying, is it not?

Dr. IKLE. Yes. I hope we can. I am somewhat less optimistic. The examples that have been mentioned of a successful industrial technology policy have something special in common. There are areas

where the U.S. Government is the buyer of most or all of the products, such as aircraft. The Air Force and the other services are large buyers. They got our aircraft industry going, and it has become very effective in the commercial sector.

In public health, the Public Health Service is dispensing public health, so it is purchasing public health things, and has properly stimulated their production and research.

In flight aviation controls, the Government is a prime purchaser. Nobody else goes and buys flight control systems.

But in areas where the Government is not the prime purchaser or one of the main purchasers, we may have less success, maybe because there is no institutional mechanism beyond our National Science Foundation, or other organizations that are more on the basic research side, to push things ahead in a long and sustained fashion.

Dr. MARK. May I respectfully take issue? There is one sector where the Government is not the customer, but Government investments once again have made this Nation absolutely the technological leader in the world, and that is agriculture. This goes back to the Homestead Act of 1862, which the Congress passed. This was a law requiring each State to set up a university which would teach agriculture and the mechanic arts. Mechanic arts was the term used for engineering in those days.

Then in 1888, Senator Justin Smith Morrill, the same individual who sponsored the 1862 legislation, initiated an act of Congress that set up the research fund for agriculture and engineering. Mr. Chairman we are still seeing the results.

The Green Revolution, the ability we have today to adapt agricultural crop plants to their environments, which is really what the Green Revolution is all about, has for all practical purposes done away with the problem of food shortages. If you have a food shortage somewhere now, it is political, or due to transportation, but not due to the lack of food. So there is another very long-term Government investment, if you will, from which enormous benefits have come.

I am not a fan of the agricultural subsidies, I should say, which is perhaps another facet of our agricultural policy because these are attempts to modify markets. But the investments we have made in agricultural technology have paid off over and over and over again, and have worked.

Dr. IKLE. We want education and technology promotion effort without building stockpiles of computers and things that go rancid. [Laughter.]

Dr. MARK. A subsidy is no good. There is no question about that.

Senator WALLOP. My time has expired, but let me just observe that with the exception of agriculture, in each of the instances where the U.S.' political involvement has driven technology and its development, we have in one way or another been able to define an "enemy."

You mentioned FDA. The enemy is the danger to public health and safety. In medical research, the enemy has been disease, whether it is heart disease or cancer, or now AIDS. In particular it is the long-term sustained role of the U.S. military in "peacetime."

I would submit that that era was not an era of peace, unless one defines peace solely as the absence of war.

I cannot remember the name of the distinguished Harvard professor who is the only one I quote, but who suggested that technology was a surrogate for war, that in fact the policy of containment had identified an enemy and identified the very real reason why we and the West, the Western allies, ought to pursue precisely what we did pursue, and in the development of each new generation of those things they were a substitute for actually going to war to prove the point that we were trying to make with the Soviet Union and its allies.

Dr. MARK. I think the point you make is an important one. There should be an enemy. What you are really saying in a nutshell is that fear of something is a driving motivation, I would say if you are talking about industrial policy, the thing to fear is poverty. The thing that could happen to us, if we do not organize our industrial system to be competitive, is that we get poor. Personally I am afraid of that. I do not like that.

Senator WALLOP. Thank you, Mr. Chairman.

Senator BINGAMAN. Thank you very much. Let me ask on another line of questions to either of you, if you have a view on it. The problem we are struggling with now is what we should do within the Federal Government to better structure or organize ourselves, if anything, in order to nurture the development of some of these key technologies, if in fact we have a good list here of technology developments that need our attention.

You look at the spreadsheet on where the funding is within the Federal budget for these, and it is all over the board. I mean, it is all over the board even when you are talking about the defense-related agencies. We do not have some of the nondefense areas covered, I do not believe, in this spreadsheet, but we will get into that with the next panel.

Do either of you have thoughts as to what could be done to actually do more than just identify these technologies and say this is important, and then go about our business as though we had not made any change in policy? If in fact one of these areas is important to pursue, should an agency be designated, a lead agency, to ensure that that area is adequately pursued?

Should a consortia be constructed involving industry and concerned agencies to monitor progress in an area? What, if anything, should we do that we are not doing? Do either of you have thoughts? I would be interested.

Dr. MARK. You put your finger on something that has to be done. I would submit that it is not necessary to set up any new agencies. I think we have the mechanisms for doing precisely what you have talked about. You have a number of Federal agencies with a responsibility for technology development for various purposes. You can make spreadsheets of that kind for agriculture, for NIH, for the Department of Health and Human Services, for Energy and for Defense. There is an Office of Science & Technology Policy in the White House whose function it is to coordinate exactly what you have talked about. I would say that the process for developing that resources allocation is there, and I have watched successive science advisors with more or less success try to influence that process.

Much depends upon personalities and how well they work with each other.

What the Congress should do, and I think this is really the important thing, is, as you have done by insisting that this document be created, is to call Dr. Bromley here and ask him exactly that question. Here are the spreadsheets. By what rationale have you allocated these resources? Then you make your judgments, when you vote on the Appropriations bill, as to whether these were correct or not in your judgment. That is the process as I see it.

I do not believe we need to have any new structures to do this. I think the structures are here. What is missing is perhaps the ideological consensus, if you will, as to what ought to be done, and I think that is also—that is apolitical function that all of us have to participate in, but then I think the mechanisms, the Federal mechanisms, are in place.

Dr. IKLE. I hope Dr. Mark's optimism is correct. I think it may be, if we keep a sustained effort going, but that will not solve the specific defense problems which are the responsibility of your committee, Mr. Chairman, particularly not in a period of shrinking defense budgets, and you will still have to do something—and I am getting back to a point I made at the beginning—to sort of keep the Pentagon running after the evolution in the commercial sector of science and technology.

It will be not possible, in a long peacetime period, with smaller budgets, smaller Pentagon R&D, to test and to explore every new scientific development, whether it could have useful military applications for us or dangerous military applications if used by our future enemies.

You will not have future reports that follow the critical technology report that can be steeped in so much work and so much funding as this one can, because this follows a period of 10, 20 years where defense was in a driving role in national technology development.

If defense becomes a smaller part of our budget and fewer people work in it, then you need a special mechanism to monitor the opportunities and dangers that will be developed by the science advisor, by the Department of Commerce, by what have you, by private industry, which the Pentagon can only sort of keep tab on but cannot really fully explore in peacetime.

I am worried about such future development, particularly if we have other large industrial nations that have very vigorous R&D efforts, and they may come up with something that could have devastating implications in the future conflict while we sit here and look at these civilian applications.

Senator BINGAMAN. Thank you. Senator Wallop, did you have any other questions?

Senator WALLOP. I would just like to follow that a little bit, because one wonders from a slightly different perspective than the conversation has led us to date, how you maintain a defense industrial base, both production and technological, in an era of shrinking support for defense, both political and financial. It seems to me that one of the things we are going to have to do is inure ourselves to some exorbitant per unit costs because of lower procurement levels, in order to get some of the product of our technological ex-

pertise in hand, and to maintain a base of production as well. Is that a fair statement?

Dr. IKLE. I would very much agree, and these costs should not be considered as the cost of fielded weapons systems, but really the cost of keeping abreast of R&D, the R&D potential, by producing certain units so we can see how they work.

Dr. MARK. I think there is another facet of what you said, and that has to do with the allocation of funds within the defense budget. You have a $300 billion budget. Half of it is personnel costs. If you look at the R&D accounts, I think the R&D accounts short of production are something of the order of $20 billion. I do not remember now. I do not have those figures in my head any more, but it is somewhere in that neighborhood. $30 billion? Well, $40 billion. Things have changed. I have been out of town for 10 years.

But it is still 10 percent of the budget. There is no reason why you cannot keep that one alive, and growing in fact, and as Dr. Ikle said——

Senator WALLOP. Would you go so far as to say, should not? I mean, you said there is no reason why we cannot.

Dr. MARK. Yes, I think we should. I think Dr. Ikle said it quite correctly. If the threat of immediate conflict recedes, what you do is you put your active duty troops into the Reserves and the National Guard, which costs you about a tenth of what an active person costs you, and you actually increase, I think, those accounts that have to do with the long-term future, and of course the R&D account is one of them.

We will have to do exactly what Dr. Ikle said. We will have to inure ourselves as you said. We have to inure ourselves to having a few very high-cost items to do the testing and the operational developments, if you will, but I think all of those things can be done, even in a shrinking defense budget, if the priority judgments that we have just outlined are made.

Senator WALLOP. I just would observe that I do not think that we will be able to retain the scientific and technical expertise only in the research mode if there is no development procurement. People ultimately will want to see the fruits of their labors, and I think it is going to be terribly difficult, unless we commit ourselves to staying modern and to acquiring certain of these. It is also important from the standpoint of maintaining the ability to build them once we know what they are.

Thank you, Mr. Chairman.

Senator BINGAMAN. Thank you, and thank you both very much for your very useful testimony this morning. We appreciate it, and we may be in touch with you as time goes by to get your thoughts on other aspects of these same problems.

Our second panel is Dr. Charles Herzfeld, Dr. George Millburn, and Mr. Richard Hahn, if they would all three come forward, please.

Dr. Herzfeld, why don't you begin?

**STATEMENT OF DR. CHARLES M. HERZFELD, DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING, DEPARTMENT OF DEFENSE**

Dr. HERZFELD. Thank you, Mr. Chairman. It is good to be back with you and the committee.

I am here to discuss the annual Critical Defense Technologies Plan, which was prepared in answer to the legislation which is stated in the written testimony. I will give a brief introduction and then Dr. Millburn will discuss the substance of the report because it was he and his colleagues who produced the report. I would like to give him all the credit and benefit that comes from this excellent output. Then I will continue with some remarks and, finally, our representative and colleague from DOE will make his comments.

This year's plan identifies 20 technologies considered to be most essential to develop for long-term qualitative superiority of United States weapons systems, and figure 1 will show this.

## CRITICAL TECHNOLOGIES PLAN

Figure 1. CONGRESSIONAL MANDATE

- PL 101-189

  "THE SECRETARY OF DEFENSE ... SHALL SUBMIT ... AN ANNUAL PLAN FOR DEVELOPING THE TECHNOLOGIES CONSIDERED ... MOST CRITICAL TO INSURING THE LONG-TERM QUALITATIVE SUPERIORITY OF UNITED STATES WEAPON SYSTEMS."

Actually, that is the legislation under which flag the effort has gone forward.

# CRITICAL TECHNOLOGIES PLAN

**Figure 2. HISTORICAL CONTEXT**

- QUALITATIVE SUPERIORITY PROVIDES UNDERPINNING TO NATIONAL SECURITY
- U.S. SUCCESSFUL IN DOING SO FOR FORTY YEARS (B-52, MINUTEMAN, POLARIS, U-2, AIRCRAFT TURBINES, SENSORS, ACCURACY IN TARGETING, SATELLITES, ETC.)

RECENT TRENDS

- DECLINE IN FUNDING FOR TECHNOLOGY BASE SINCE 1965:
  - FEWER $ FOR BUDGET CATEGORIES 6.1, 6.2, 6.3A

CONSEQUENCES

- U.S. TECHNOLOGY BASE IS RUSTING
  - CONSISTS OF 80's RESEARCH AND EARLY 80's TECHNOLOGY
- RADICALLY NEW CONCEPTS ARE DIFFICULT TO IMPLEMENT
  - REGARDLESS OF MERIT
  - NOT ENOUGH $ TO DEMONSTRATE NEW TECHNOLOGIES
- EXPECTATIONS ARE UNSUSTAINABLE

The next slide shows some historical context which is quite important for the committee to know.

We are in a new phase in the relationship between countries, and this is certainly going to make a big difference. However, qualitative superiority still provides the underpinnings of national security.

We have been very successful in the past. Examples are shown in this Vugraph. The trends of the last 20 years or so in the DOD funding of the technology base has been fraught with problems and fundamentally less dollars for these budget categories have been explored.

Now, we need to realize that other funds are coming into play over the same period, so the net effect is not quite as bad as one might think. It is still real and something that needs to be addressed.

There is another factor here that does not get enough mention. R&D is getting more expensive to do per unit of effort because we are working on harder problems than in the past. To compare, for example, the cost of a fighter plane of 1946 vintage and calculate that cost in today's dollars misses enormous improvements that have taken place. It is really quite a different thing and certainly not apples to apples.

From the point of view of R&D, a way to look at that is—climbing Mount Everest is a lot harder than climbing a mountain in the Appalachians. We are having to climb Everest over and over again.

Another way to look at this is to drill a 10,000 foot deep well for oil is tougher than to drill a 2,000 foot deep well and find the easy oil. We are now going after the touch technologies that are harder to do.

There is a rule of thumb among people who run R&D establishments. An increase in the R&D Price Index so to say is about twice the increase in the Consumer Price Index as a rough rule of thumb. So, if you use the Consumer Price Index to deflate to common base, you are really cutting meat from the bone even though you do not realize it. That is a fact that everybody who has run these things knows. I am sure Hans Mark has had similar experiences. It is not well articulated. There are not a lot of papers written about it that we can refer to, but it is a fact, and it is highly germane to what we are trying to accomplish.

Senator BINGAMAN. You are saying that in order to stay even we need to have an increase in the tech base funding, which would be twice the Consumer Price Index?

Dr. HERZFELD. Roughly. This is a ballpark thing. One could argue that it is 1.5 times the CPI, but it is certainly appreciably more than just the same as the Consumer Price Index. That has been my experience over the last 40 years, and I am sure lots of people will agree with that.

## CRITICAL TECHNOLOGIES PLAN

Figure 3. DEFENSE PLANNING GUIDANCE REQUIRES CONTINUED QUALITATIVE SUPERIORITY ...

... AND CONTINUED QUALITATIVE SUPERIORITY REQUIRES ARRESTING EROSION OF THE TECHNOLOGY BASE THROUGH:

- CLEAR REALISTIC LONG-TERM GOALS
- A HEALTHY INFRASTRUCTURE
- ADEQUATE RESOURCES
  - — TO DEVELOP NEW TECHNOLOGIES (6.1, 6.2)
  - — TO DEMONSTRATE NEW SYSTEMS CAPABILITY USING NEW TECHNOLOGIES (6.3A)
- AN EFFICIENT MECHANISM FOR TURNING CONCEPTS INTO SYSTEMS
  - — THAT ARE CAPABLE OF MEETING THE LONG-TERM GOALS

This shows what the plan is about, and it is easy enough to read. I do not need to brief it in any detail. It addresses resources, long-range goals, an efficient mechanism of turning concepts into systems, all things you have already talked about in the earlier panel, and I do not wish to repeat points well made before, just to sort of say amen about them.

## CRITICAL TECHNOLOGIES PLAN

Figure 4. ADDITIONAL CONSIDERATIONS FOR THIS YEAR'S PLAN

- BROADER CONGRESSIONAL TASKING
- INCREASED DISCUSSION OF MANUFACTURING ISSUES
- NEW SELECTION CRITERIA
  - — (INCLUDES: STRENGTHENING THE INDUSTRIAL BASE)
- FUNDING SHOWN OVER A DECADE (NOT JUST ONE YEAR)
- CRITICAL TECHNOLOGIES PRIORITIZED
- INTELLECTUAL CONSOLIDATION OF SOME CRITICAL TECHNOLOGIES
  - — EMPHASIZING *TECHNOLOGY* RATHER THAN *NEED*
  - — COMBINING CLOSELY RELATED TECHNOLOGIES

The next Vugraph has additional considerations. We have a broader tasking. In this report we have increased discussion of manufacturing issues which is a trend that will continue as we discover more and more that the importance of the technology for manufacturing is a separate issue, a separate problem, and that really has to do with the defense industrial base, one aspect that Senator Wallop highlighted. We are becoming very aware of this, and we will address that with great care, increasing care as we learn better how to think about these things.

I do wish to remind the committee that we are really just in the second year of doing this, and there is a lot more to learn, and we are gearing up to do that. I will point out some of these additional concepts we wish to introduce into the process, and so I expect we will have more useful products as time goes on.

We need to look at the funding over a decade, not just 1 year or 2, or 5 or 6, realizing that is a highly speculative enterprise for lots of reasons. I will come back to this point.

The issue of the predictability of RDT&E budgets is important, and we need to do an intelligent job of consolidating the Critical Technologies. It depends on whose list you look at, the Japanese have a list of 200 or 300 of what they call critical technologies. I think you will find almost all of the 300 on their list included in our 20. There is not any great disagreement about the 20. It is just that we quite properly, I believe, require a more highly aggregated look at the problem, and that is the way we did it, and that is how it turned out. George Millburn will explain that in detail.

I would like to now digress a little and talk about the Technology Strategy that we are beginning to work on and how we want to look at that. It is of great interest to the committee, and it is really necessary to give abroad enough context to our deliberations here this morning.

## THE OBJECTIVES

- KEY ELEMENT OF NATIONAL STRATEGY:

  MAINTAIN TECHNOLOGICAL SUPERIORITY

- THIS REQUIRES:
  - ROBUST LEADING EDGE IN S&T AREAS IMPORTANT FOR DEFENSE
  - EFFECTIVE USE OF S&T BASE TO DESIGN, BUILD AND MANUFACTURE THE MOST CAPABLE MILITARY SYSTEMS THE COUNTRY NEEDS
  - IMAGINATIVE USE OF S&T BASE FOR TRAINING, LOGISTICS

The next chart shows the key element of this National Defense Technology Strategy. We need to maintain technological superiority. That is unchanged and is really required by many, many aspects of the defense problem.

I would like to make the following point. In business when you are doing well, you invest in the future. When you make money, you can afford to renovate your plant, to get new equipment, to hire better people. That is when you invest in the future.

From the general point of view of national security things are going extraordinarily well for this country in this year and, hopefully, next year. Therefore, I believe we should invest in the future. While cuts in the defense budget are obviously called for and proposed by the administration and certainly contemplated also by the Congress, it is important to not lose sight of the fact that this is the time to invest in the future. And these issues have been addressed both by Dr. Ikle and Dr. Mark, but I would like to make the point very strongly myself.

To maintain technological superiority requires that we have a robust leading edge in the science and technology areas important for defense.

As you know, that means that there should not be a lot of surprises hanging out there that we do not anticipate, that we are doing most of the important things that need to be done, and that we are in touch with most of the important work that is going on out there. That is what robust means, and it is a key word and, needless to say, translates into dollars at some stage.

You cannot have a robust posture unless you beef up our objective, and that is our plan, and the strategy and the plan will indicate what robustness is called for and what the resource implications of robustness are.

We need to use the S&T base to design, build and manufacture the most capable systems that the military will need. That is required, particularly as the numbers of equipment and of military on active duty drops and because the world remains a rather dangerous place in various ways, though not necessarily in terms of the grand attack from the Warsaw Pact that has driven so much of defense planning over the last 40 years.

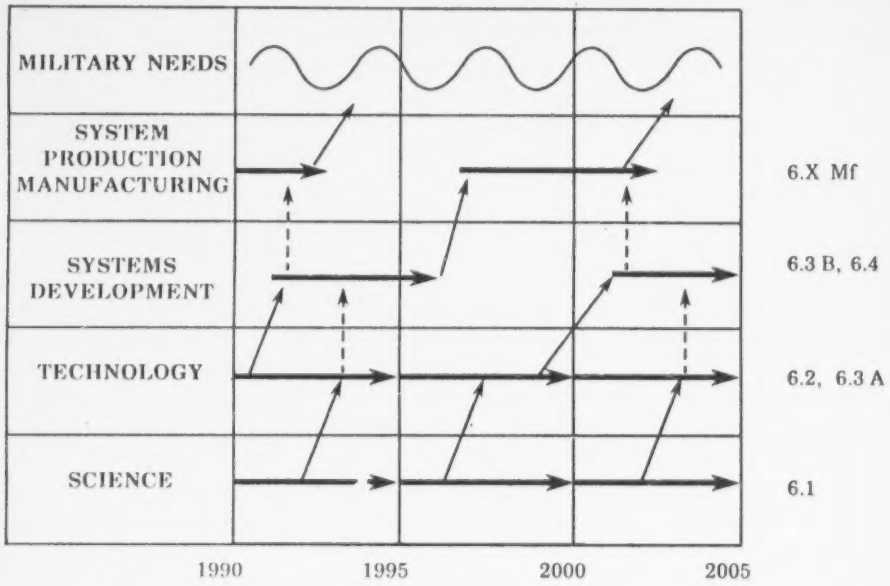
Parenthetically I would say that the Soviets are continuing to modernize their strategic forces, that most of their ground forces have not yet left the Warsaw Pact countries. There are some indications that some will, some have indeed left, but the bulk is still in place.

I do not wish to get into an arcane and esoteric debate about irreversibility here, but I think we need to look at the realities that we see on the ground and treat with care the promises and predictions. That is part of our job in this national dialogue that needs to be going on regarding this subject.

The last double bullet is important for the interests of this committee and others. The S&T basis of the Defense Department can make available for general use technologies that are very important for training. We plan to exert good efforts on training technology, mostly computerized, modeling, and simulation, tied in with communications, and this clearly can have wide application in education both in middle school levels and in advanced levels of education.

We are also working on the technologies for logistics support which may be useful in various business situations.

# THE PROCESS




The next chart is a complicated one, but absolutely key to understanding what we are trying to do. I am trying to show here how science flows into technology, how technology flows into systems development, and how systems development flows into production and manufacturing of military systems that address military needs.

This is an all-purpose chart in the sense that it captures a number of the key features with which we have to deal.

Let me start with the top bar. The "wavy" military needs is an indication of just that. They are going to change from time to time as new threats emerge and others disappear. We are in the middle of one of the biggest changes, or biggest "waves," in 40 years.

If we look ahead 15 years, which we must do for this kind of planning, we must confidently expect that there will be ups and downs on this top bar.

Our job is to provide the tools for the Department to provide the military with the equipment they will need for the emergencies and contingencies that will occur.

The systems production and manufacturing is a level of effort that gets turned on and off as systems are needed. It is not the steady state effort. One builds a system, produces an appropriate number, which may be small or large, depending upon what it is, and then the process goes on to something else. Hence the breaks in the line on the second tier from the top.

Similarly in systems development, that is usually done in preparation for production. We will come back to this point.

There are some interesting options here that are important to discuss and that our strategy will explore, and we will give some guidelines for how to think about these issues.

The technology effort, however, and the science effort that underlies its needs should go on in a steady state with a steady pace and with a hopefully steady budget and with a firm hand on the priorities and on the long-term objectives. That is what we plan to do. That is what we propose to do.

My hope is that we can come in next year, say, or perhaps even this fall with a story which is so clear to the Congress that we can focus on the big issues and that you can trust us with managing the little issues. That will be more efficient and allow you to concentrate on the more important problems. Hopefully we will be in a position where we can convey the competence and we will have your confidence that we can do this job.

Now, the solid lines that lead from the lower tier and to the next two tiers, the solid slanted arrows, are intended to convey the systematic, orderly and planned transfer of science and technology into systems development and manufacturing. This is the regular, if you will, usual acquisition process that we do day in and day out.

The dotted arrows that you see are quick insertions of upgrades or improvements which will be possible if the systems are designed in a sufficiently modular manner, as Dr. Ikle reminded us. And my hope is that as part of the acquisition process we can demand from the designers that the systems be designed in such a way that they are easy to upgrade. Then we plan to have the technology available for these upgrades, and the upgrades can take place or not as the need arises and as the budget allows. But it is my job to make sure that these options for upgrading are available when needed.

The "6.X manufacturing" is another subcategory of R&D that we are considering, that addresses manufacturing technology head on. It is too soon to say whether to call out a separate category of funds is a good idea or not. There may be good reasons not to do it, but this would be one way of highlighting a problem and coming to grips with it.

## THE PRIORITIES

1. MAKE TECHNOLOGICAL SUPERIORITY AVAILABLE
   - DOMINANT TECHNOLOGICAL SUPERIORITY WHEN, WHERE NEEDED
2. SUPPORT NATIONAL SECURITY OBJECTIVES
   - DETER LARGE AND SMALLER THREATS
   - HAVE ABILITY TO RESPOND IF REQUIRED
   - PROJECT STRENGTH AND DETERMINATION
3. SYSTEMS MUST BE USEABLE IN VARIETY OF CONTINGENCIES
4. SYSTEMS MUST BE DESIGNED IN MODULAR WAY TO MAKE UPGRADING EASY
5. TECHNOLOGY OPTIONS MUST BE AVAILABLE, MUST BE DEMONSTRATED (PROTOTYPES)
6. USER PULL AND TECHNOLOGY PUSH
7. SUFFICIENT RESOURCES FOR ALL PHASES

The next and final chart shows the priorities of the strategic plan. We want to make the technological superiority available. That means we have to have dominant technology where and when it is needed; and again, that is not across the board, but we have to make choices. Where we have made the choices, we must make sure it happens.

Number two, we have to support the national security objectives, deter large and small threats, have the ability to respond to either if required, and project strength. That is a very important element of our national posture.

The reason we have had relatively few wars in the last 40 years is because we have appeared very strong and powerful to a lot of people who do not like us, and they decided not to take us on. We must preserve the perception that we are strong and powerful and have the will to use the strength.

It is a very important issue, and something the Congress can help with in building into the dialogue about recent events.

The systems we build must be usable in a variety of contingencies, and I am basically repeating here what is in the defense policy guidance. The systems must be designed in a modular way to make upgrading easy. Technology options must be available, and they must be demonstrated; hence, prototypes of various kinds are needed as we go through the process.

We must have both "user pull" and "technology push." There has to be room for both. The chart that I showed just before tends to focus on the user pull. We must preserve the freedom to invent another Minuteman or another Polaris. There were no written requirements for either of those systems ever. They were very fine

ideas, it turned out, and we must preserve the ability to move like that when somebody comes along with a very good idea.

Finally, there must be sufficient resources for all phases, and that has to do with resolve. Either we mean it as a country or we do not, and we must make up our minds whether we mean it and how we want to do it. Of course, we are in a fiscally constrained situation. Everyone is, and, of course, the Defense Department budget will be reduced from earlier plans. There is no argument about that. It is important how we do it, why we do it, and where we do it. That has been explained very well by the previous panelists, and I do not need to go into detail on this.

Back to the main story. Dr. Millburn will describe the plan after which I will then come back and make some more comments. I suggest now that Dr. Millburn take over if that is agreeable with you.

[The prepared statement of Dr. Herzfeld follows:]

DR. CHARLES M. HERZFELD
DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING
DEPARTMENT OF DEFENSE

STATEMENT ON THE

CRITICAL TECHNOLOGIES PLAN

GOOD MORNING MR. CHAIRMAN, SENATORS, LADIES AND GENTLEMEN.

I AM PLEASED TO BE HERE TODAY TO DISCUSS WITH YOU THE SECOND ANNUAL DEFENSE TECHNOLOGIES PLAN. THE PLAN WAS PREPARED IN RESPONSE TO THE NATIONAL DEFENSE AUTHORIZATION ACT FOR FISCAL YEARS 1990 AND 1991, PUBLIC LAW 101-189, SECTION 2508. MY DEPUTY DIRECTOR FOR RESEARCH AND AND ADVANCED TECHNOLOGY, DR. GEORGE MILLBURN, IS ACCOMPANYING ME, AND WILL ASSIST IN BRIEFING THE PLAN.

THIS YEAR'S CRITICAL TECHNOLOGIES PLAN IDENTIFIES TWENTY TECHNOLOGIES "CONSIDERED TO BE THE TECHNOLOGIES MOST ESSENTIAL TO DEVELOP IN ORDER TO INSURE THE LONG-TERM QUALITATIVE SUPERIORITY OF UNITED STATES WEAPON SYSTEMS" (FIGURE 1). THE PLAN WAS DEVELOPED BY THE DEPARTMENT OF DEFENSE WITH THE PARTICIPATION AND COOPERATION OF THE DEPARTMENT OF ENERGY.

WE HAVE PROVIDED THE COMMITTEE WITH COPIES OF THE PLAN, WHICH CONTAINS A DETAILED ANALYSIS OF EACH OF THE 20 TECHNOLOGIES AS REQUESTED BY LAW.

FIRST I SHALL GIVE AN INTRODUCTORY OVERVIEW, BEGINNING WITH THE HISTORICAL BACKGROUND.

THEN DR. MILLBURN WILL DESCRIBE DOD'S PLANNING PROCESS FOR SCIENCE AND TECHNOLOGY (S&T), AND WILL SHOW HOW THE CRITICAL TECHNOLOGIES RELATE TO OUR S&T INVESTMENT STRATEGY. HE WILL OUTLINE THE MAIN FEATURES OF THE CRITICAL TECHNOLOGIES PLAN, HOW WE WENT ABOUT ADDRESSING THE CONGRESSIONAL REQUIREMENTS, HOW THE PLAN DIFFERS FROM LAST YEAR'S PLAN, AND HOW THE CRITICAL TECHNOLOGIES WERE PRIORITIZED.

FINALLY, I SHALL PICK UP THE STORY THERE, DESCRIBE THE 20 TECHNOLOGIES SELECTED IN MORE DETAIL, SUMMARIZE FOREIGN CAPABILITIES IN THESE TECHNOLOGIES, DISCUSS OUR INTERACTIONS WITH INDUSTRY DURING THE PREPARATION OF THE REPORT, AND TALK ABOUT FUTURE PLANS.

FIGURE 2 SUMMARIZES THE HISTORICAL CONTEXT, AND INDICATES THAT UNFULFILLED EXPECTATIONS CAN BE TRACED AT LEAST IN PART TO A DECLINE IN THE TECHNOLOGY BASE.

FIGURES 3 LISTS THE RESOURCES NECESSARY TO MAINTAIN THE CONTINUED QUALITATIVE SUPERIORITY IN UNITED STATES WEAPON SYSTEMS, AND A HEALTHY TECHNOLOGY BASE.

THESE SAME REQUIREMENTS ARE NEEDED TO MAINTAIN AND RESTORE OUR INTERNATIONAL COMPETITIVENESS. WITH THAT IN MIND, CONGRESS WANTED ANSWERS TO MANY MORE QUESTIONS THAN WERE ASKED LAST YEAR (FIGURE 4).

DR. MILLBURN GUIDED THE EFFORT TO DEVELOP THE CRITICAL TECHNOLOGIES PLAN BEFORE I ARRIVED ON THE SCENE. I SHALL THEREFORE ASK HIM TO DESCRIBE TO YOU HOW THIS YEAR'S CRITICAL TECHNOLOGIES PLAN WAS DEVELOPED.

(Dr. Millburn describes how this year's critical technologies were developed, Dr. Herzfeld then continues.)

I NOW WANT TO GET TO THE CORE OF THE PLAN. I WANT TO OUTLINE THE APPROACH, DESCRIBE BRIEFLY EACH OF THE TWENTY TECHNOLOGIES, AND SUMMARIZE OUR FINDINGS. THE PRINCIPAL FEATURES OF THE PLAN ARE LISTED IN FIGURE 5.

EACH TECHNOLOGY IS DESCRIBED IN DETAIL IN 20 SECTIONS (APPENDIX A OF THE REPORT). EACH SECTION IS ORGANIZED IN SUCH A WAY AS TO COVER ALL ASPECTS OF THE LAW. INPUTS WERE OBTAINED FROM EACH SERVICE AND INVOLVED DEFENSE AGENCY, AS WELL AS FROM DOE'S DEFENSE PROGRAMS AND ITS NATIONAL LABORATORIES. THESE

INPUTS WERE ASSEMBLED, REVISED, AND DISCUSSED EXTENSIVELY AT SEVERAL MEETINGS OF THE WORKING GROUP. THE STEERING COMMITTEE WAS KEPT FULLY INFORMED THROUGHOUT THIS PROCESS, AND REVIEWED THE SEVERAL DRAFTS. THE FINAL MAKEUP OF EACH SECTION, IN ORDER TO COVER ALL THE CONGRESSIONAL INTEREST ITEMS, MAY BE GLEANED FROM THE SECTION HEADINGS REPRODUCED IN FIGURE 6.

THE FOLLOWING CRITICAL TECHNOLOGIES WERE SELECTED (NOT SHOWN HERE IN ANY PRIORITY ORDER):

- SEMICONDUCTOR MATERIALS AND MICROELECTRONIC CIRCUITS
- SOFTWARE PRODUCIBILITY
- PARALLEL COMPUTER ARCHITECTURES
- MACHINE INTELLIGENCE AND ROBOTICS
- SIMULATION AND MODELING
- PHOTONICS
- SENSITIVE RADARS
- PASSIVE SENSORS
- SIGNAL PROCESSING
- SIGNATURE CONTROL
- WEAPON SYSTEM ENVIRONMENT
- DATA FUSION
- COMPUTATIONAL FLUID DYNAMICS
- AIR-BREATHING PROPULSION
- PULSED POWER
- HYPERVELOCITY PROJECTILES
- HIGH ENERGY DENSITY MATERIALS
- COMPOSITE MATERIALS
- SUPERCONDUCTIVITY
- BIOTECHNOLOGY MATERIALS AND PROCESSES

FIGURE 7 SUMMARIZES THEIR OBJECTIVES.

NOW SCIENCE AND TECHNOLOGY ARE INTERNATIONAL. NATIONAL BOUNDARIES, AND VARIOUS EXPORT CONTROL MECHANISMS, CAN SLOW DOWN THE FLOW OF IDEAS OR CAPABILITIES, BUT CANNOT STOP THEM. ANY PLANNING ACTIVITY MUST THEREFORE TAKE INTO ACCOUNT THE STATE OF SCIENCE AND TECHNOLOGY IN ALL COUNTRIES. SMALLER COUNTRIES, TOO, CAN AND DO MAKE GREAT CONTRIBUTIONS IN NICHES OF TECHNOLOGY IN WHICH THEIR RESEARCHERS HAVE SPECIALIZED. THE ASSESSMENT OF FOREIGN CAPABILITIES IS SHOWN IN 20 TABLES, ONE FOR EACH CRITICAL TECHNOLOGY. A SUMMARY FOR ALL TWENTY TECHNOLOGIES IS GIVEN AT THE BEGINNING OF THE REPORT (AND IS REPRODUCED HERE IN FIGURE 8).

IN DEVELOPING THE REPORT SEVERAL PRODUCTIVE INTERACTIONS

WITH INDUSTRY TOOK PLACE. INDUSTRY ASSOCIATIONS ESPECIALLY CAN PLAY A KEY ROLE IN PROVIDING A FORUM FOR THE EXCHANGE OF IDEAS, FOR DRAWING UP STRATEGIC PLANS TO DEVELOP KEY TECHNOLOGIES, AND FOR ACTING AS A SOUNDING BOARD TO IMPROVE DOD'S CRITICAL TECHNOLOGIES PLAN. I PARTICULARLY WANT TO ACKNOWLEDGE THE HELP RECEIVED THIS YEAR FROM THREE INDUSTRY ASSOCIATIONS, THE AEROSPACE INDUSTRIES ASSOCIATION, THE ELECTRONIC INDUSTRIES ASSOCIATION, AND THE NATIONAL SECURITY INDUSTRIAL ASSOCIATION.

MUCH WORK REMAINS TO BE DONE. FUTURE PLANS INCLUDE: RELATING THE CRITICAL TECHNOLOGIES TO THE OVERALL DOD STRATEGIC PLANNING PROCESS; STRENGTHENING THE LEAD ORGANIZATIONS FOR INDIVIDUAL CRITICAL TECHNOLOGIES; INCREASING INTERACTION WITH INDUSTRY AND ACADEMIA; AND GAINING CONGRESSIONAL SUPPORT (SUMMARIZED IN FIGURE 9).

# CRITICAL TECHNOLOGIES PLAN

**Figure 1. CONGRESSIONAL MANDATE**

- PL 101-189

  "THE SECRETARY OF DEFENSE ... SHALL SUBMIT ... AN ANNUAL PLAN FOR DEVELOPING THE TECHNOLOGIES CONSIDERED ... MOST CRITICAL TO INSURING THE LONG-TERM QUALITATIVE SUPERIORITY OF UNITED STATES WEAPON SYSTEMS."

**Figure 2. HISTORICAL CONTEXT**

- QUALITATIVE SUPERIORITY PROVIDES UNDERPINNING TO NATIONAL SECURITY
- U.S. SUCCESSFUL IN DOING SO FOR FORTY YEARS (B-52, MINUTEMAN, POLARIS, U-2, AIRCRAFT TURBINES, SENSORS, ACCURACY IN TARGETING, SATELLITES, ETC.)

RECENT TRENDS

- DECLINE IN FUNDING FOR TECHNOLOGY BASE SINCE 1965:
  - FEWER $ FOR BUDGET CATEGORIES 6.1, 6.2, 6.3A

CONSEQUENCES

- U.S. TECHNOLOGY BASE IS RUSTING
  - CONSISTS OF 80's RESEARCH AND EARLY 80's TECHNOLOGY
- RADICALLY NEW CONCEPTS ARE DIFFICULT TO IMPLEMENT
  - REGARDLESS OF MERIT
  - NOT ENOUGH $ TO DEMONSTRATE NEW TECHNOLOGIES
- EXPECTATIONS ARE UNSUSTAINABLE

# CRITICAL TECHNOLOGIES PLAN

**Figure 3. DEFENSE PLANNING GUIDANCE REQUIRES CONTINUED QUALITATIVE SUPERIORITY ...**

... AND CONTINUED QUALITATIVE SUPERIORITY REQUIRES ARRESTING EROSION OF THE TECHNOLOGY BASE THROUGH:

- CLEAR REALISTIC LONG-TERM GOALS
- A HEALTHY INFRASTRUCTURE
- ADEQUATE RESOURCES
  - — TO DEVELOP NEW TECHNOLOGIES (6.1, 6.2)
  - — TO DEMONSTRATE NEW SYSTEMS CAPABILITY USING NEW TECHNOLOGIES (6.3A)
- AN EFFICIENT MECHANISM FOR TURNING CONCEPTS INTO SYSTEMS
  - — THAT ARE CAPABLE OF MEETING THE LONG-TERM GOALS

**Figure 4. ADDITIONAL CONSIDERATIONS FOR THIS YEAR'S PLAN**

- BROADER CONGRESSIONAL TASKING
- INCREASED DISCUSSION OF MANUFACTURING ISSUES
- NEW SELECTION CRITERIA
  - — (INCLUDES: STRENGTHENING THE INDUSTRIAL BASE)
- FUNDING SHOWN OVER A DECADE (NOT JUST ONE YEAR)
- CRITICAL TECHNOLOGIES PRIORITIZED
- INTELLECTUAL CONSOLIDATION OF SOME CRITICAL TECHNOLOGIES
  - — EMPHASIZING *TECHNOLOGY* RATHER THAN *NEED*
  - — COMBINING CLOSELY RELATED TECHNOLOGIES

# CRITICAL TECHNOLOGIES PLAN

Figure 5. PRINCIPAL FEATURES OF THE PLAN

- LINKS CRITICAL TECHNOLOGIES TO DOD SCIENCE AND TECHNOLOGY STRATEGY
- SELECTS 20 CRITICAL TECHNOLOGIES
- PRIORITIZES THEM
- PROVIDES FUNDING ESTIMATES
- INDICATES MILESTONES TO 2005
- PROVIDES INTERNATIONAL COMPARISONS
- INCLUDES INDUSTRIAL BASE AND MANUFACTURING ISSUES

Figure 6. SUBJECTS ADDRESSED IN THE REPORT

- DESCRIPTION OF THE TECHNOLOGY
- PAYOFF
- S&T PROGRAMS
- RELATED MANUFACTURING CAPABILITY
- R&D IN THE UNITED STATES
- INTERNATIONAL ASSESSMENT

# CRITICAL TECHNOLOGIES PLAN

## Figure 7. TECHNOLOGY OBJECTIVES

- SEMICONDUCTOR MATERIALS AND MICROELECTRONIC CIRCUITS:
  - — HIGH-SPEED COMPUTING AND SIGNAL PROCESSING, AUTOMATIC CONTROL, SENSITIVE RECEIVERS, MILLIMETER WAVE RADAR, PHOTONICS
- SOFTWARE PRODUCIBILITY:
  - — AFFORDABLE, TRUSTED SOFTWARE, AUTOMATIC SOFTWARE GENERATION, REUSABLE SOFTWARE
- PARALLEL COMPUTER ARCHITECTURES:
  - — ULTRA-HIGH-SPEED COMPUTING
- MACHINE INTELLIGENCE AND ROBOTICS:
  - — BUILD HUMAN INTELLIGENCE INTO MECHANICAL DEVICES, MANUFACTURING, MAINTENANCE
- SIMULATION AND MODELING:
  - — TESTING CONCEPTS AND DESIGNS WITHOUT EXPENSIVE REPLICAS, TRAINING FOR COMPLEX MILITARY SCENARIOS
- PHOTONICS:
  - — ULTRA-HIGH-DENSITY MEMORIES AND HIGH-VOLUME, HIGH-SPEED INFORMATION PROCESING
- SENSITIVE RADARS:
  - — NON-COOPERATIVE TARGET IDENTIFICATION, DETECTION OF LOW-OBSERVABLE TARGETS
- PASSIVE SENSORS:
  - — SILENT SENSING OF TARGETS OR ENVIRONMENT, MONITORING EQUIPMENT (CONDITION SENSING)
- SIGNAL PROCESSING:
  - — PROCESSING SIGNALS FOR INFORMATION EXTRACTION, AUTOMATIC TARGET DETECTION/TRACKING/CLASSIFICATION/RECOGNITION
- SIGNATURE CONTROL:
  - — CONTROLLING PLATFORM OR WEAPON SIGNATURES (RADAR, OPTICAL, ACOUSTIC, ETC.) TO ENHANCE THEIR SURVIVABILITY
- WEAPON SYSTEM ENVIRONMENT:
  - — UNDERSTANDING OR PREDICTING THE BEHAVIOR OF THE ENVIRONMENT TO ENHANCE WEAPON EFFECTIVENESS
- DATA FUSION:
  - — COMBINING AND INTERPRETING DATA FROM SEVERAL SOURCES AND PRESENTING IT IN A CONVENIENT FORM TO THE HUMAN OPERATOR
- COMPUTATIONAL FLUID DYNAMICS:
  - — MODELING OF COMPLEX FLUID FLOW TO MAKE DEPENDABLE PREDICTIONS BY COMPUTING, THUS OBVIATING EXPENSIVE FACILITIES AND EXPERIMENTS

# CRITICAL TECHNOLOGIES PLAN

## Figure 7. TECHNOLOGY OBJECTIVES (CONT.)

- **AIR BREATHING PROPULSION:**
  - — LIGHT-WEIGHT, FUEL EFFICIENT ENGINES
- **PULSED POWER:**
  - — COMPACT, LIGHT-WEIGHT, LOW-VOLUME DEVICES FOR HIGH-POWER MICROWAVES, HIGH-ENERGY LASERS, ELECTROTHERMAL GUNS, RADARS, ELECTROMAGNETIC LAUNCHERS, PARTICLE BEAMS
- **HYPERVELOCITY PROJECTILES:**
  - — TO PENETRATE HARDENED TARGETS
- **HIGH ENERGY DENSITY MATERIALS:**
  - — SAFE, TRANSPORTABLE, EFFICIENT ENERGETIC MATERIALS FOR EXPLOSIVES AND PROPELLANTS
- **COMPOSITE MATERIALS:**
  - — HIGH-TEMPERATURE, HIGH-STRENGTH, LIGHT-WEIGHT COMPOSITE MATERIALS FOR AEROSPACE APPLICATIONS
- **SUPERCONDUCTIVITY:**
  - — FABRICATION AND EXPLOITATION OF SUPERCONDUCTING MATERIALS
- **BIOTECHNOLOGY:**
  - — SYSTEMATIC APPLICATION OF BIOLOGY IN MILITARY ENGINEERING OR MEDICINE

## Figure 8. FOREIGN TECHNOLOGICAL CAPABILITIES

| Critical Technologies | USSR | NATO Allies | Japan |
|---|---|---|---|
| 1. Semiconductor Materials and Microelectric Circuits | ☐ | ☐☐ | ☐☐☐☐ |
| 2. Software Producibility | ☐ | ☐☐ | ☐☐ |
| 3. Parallel Computer Architectures | ☐ | ☐☐ | ☐☐ |
| 4. Machine Intelligence and Robotics | ☐ | ☐☐☐ | ☐☐☐☐ |
| 5. Simulation and Modeling | ☐ | ☐☐☐ | ☐☐☐ |
| 6. Photonics | ☐☐ | ☐☐ | ☐☐☐☐ |
| 7. Sensitive Radars | ☐ | ☐☐ | ☐☐ |
| 8. Passive Sensors | ☐☐ | ☐☐ | ☐☐ |
| 9. Signal Processing | ☐☐ | ☐☐ | ☐☐ |
| 10. Signature Control | ☐☐ | ☐☐ | ☐☐ |

# CRITICAL TECHNOLOGIES PLAN

## Figure 8. FOREIGN TECHNOLOGICAL CAPABILITIES (CONT.)

| Critical Technologies | USSR | NATO Allies | Japan |
|---|---|---|---|
| 11. Weapon System Environment | | | |
| 12. Data Fusion | | | |
| 13. Computational Fluid Dynamics | | | |
| 14. Air-Breathing Propulsion | | | |
| 15. Pulsed Power | | | |
| 16. Hypervelocity Projectiles | | | |
| 17. High Energy Density Materials | | | |
| 18. Composite Materials | | | |
| 19. Superconductivity | | | |
| 20. Biotechnology Materials and Processes | | | |

Figure 8. FOREIGN TECHNOLOGICAL CAPABILITIES (CONT.)

LEGEND:

| POSITION OF THE USSR RELATIVE TO THE UNITED STATES | | CAPABILITY OF OTHERS TO CONTRIBUTE TO THE TECHNOLOGY | |
|---|---|---|---|
| | Significant leads in some niches of technology | | Significantly ahead in some niches of technology |
| | Generally on a par with the United States | | Capable of making major contributions |
| | Generally lagging except in some areas | | Capable of making some contributions |
| | Lagging in all important aspects | | Unlikely to make any immediate contribution |

# CRITICAL TECHNOLOGIES PLAN

Figure 9. FUTURE PLANS

- ORGANIZE WITHIN DOD TO DEVELOP TECHNOLOGY STRATEGY AND ACTION PLAN
- TIE TO THIS INVESTMENT STRATEGY AND THE CRITICAL TECHNOLOGIES PLAN, IN A COHERENT FASHION
- TASK THE LEAD ORGANIZATIONS
- COORDINATE WITH INDUSTRY AND ACADEMIA
- WORK WITH CONGRESS

Senator BINGAMAN. Dr. Millburn, go right ahead.

**STATEMENT OF DR. GEORGE P. MILLBURN, DEPUTY DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING (RESEARCH AND ADVANCED TECHNOLOGY)**

Dr. MILLBURN. Mr. Chairman and Senator Wallop. I am happy to be here with you. I am going to bring this down from a global picture to the nitty gritty of how we actually put the plan together.

## CRITICAL TECHNOLOGIES PLAN

Figure 1. THE PARTICIPANTS

STEERING COMMITTEE: SENIOR S&T MANAGERS FROM DOD, SERVICES, DOE

WORKING GROUP: OSD (CHAIRMANSHIP)
ARMY
NAVY
AIR FORCE
DARPA
DIA
DNA
SDIO

DOE HEADQUARTERS

DOE NATIONAL LABORATORIES:
LAWRENCE LIVERMORE
LOS ALAMOS
SANDIA

This first chart will show how we organized ourselves to do it. It is almost identical with the procedure we used last year. We established a steering committee which consisted of all the senior managers from the three services for the science and technology program, included representatives from the Defense Advanced Research Project Agency, the Defense Nuclear Agency, and the Office of the Assistant Secretary for Defense Programs in the Department of Energy.

Now reporting to that steering committee was a working group. As you can see, the membership there was enlarged to include the Defense Intelligence Agency, the Strategic Defense Initiative Office, and the three Department of Energy National Laboratories. Generally speaking, the working group members were the subordinates of the members of the steering committee.

The steering committee met periodically, reviewed the progress and gave guidance to the working group.

Figure 2. SELECTION CRITERIA

| (1) PERFORMANCE FACTORS | (2) QUALITY DESIGN FACTORS | (3) PERVASIVENESS FACTORS |
|---|---|---|
| • Enhanced Performance of Weapon Systems | • Improved Availability and Dependability of Weapon Systems | • Wide Applicability to Weapon Systems |
| • New Military Capabilities | • Improved Affordability of Weapon Systems | • Spin-off/on to Industrial Base |

We added a third set of selection criteria this year. The first two sets are the same as we used last year. We added something we call pervasiveness factors, which include the wide applicability to weapons systems, which Dr. Herzfeld has already mentioned is important, and which also includes recognizing the need for improving the industrial base in general, both the spin-off to the civilian industrial base and the spin-on to the defense which is inherent in a strong industrial base.

# CRITICAL TECHNOLOGIES PLAN

**Figure 3. LIST OF CRITICAL TECHNOLOGIES**

- SEMICONDUCTOR MATERIALS & MICROELECTRONIC CIRCUITS
- SOFTWARE PRODUCIBILITY
- PARALLEL COMPUTER ARCHITECTURES
- MACHINE INTELLIGENCE / ROBOTICS
- SIMULATION AND MODELING
- PHOTONICS
- SENSITIVE RADARS
- PASSIVE SENSORS
- SIGNAL PROCESSING
- SIGNATURE PROCESSING
- WEAPON SYSTEM ENVIRONMENT
- DATA FUSION
- COMPUTATIONAL FLUID DYNAMICS
- AIR BREATHING PROPULSION
- PULSED POWER
- HYPERVELOCITY PROJECTILES
- HIGH ENERGY DENSITY MATERIALS
- COMPOSITE MATERIALS
- SUPERCONDUCTIVITY
- BIOTECHNOLOGY MATERIALS & PROCESSES

The 20 critical technologies that we came up with this year I'm sure you are well familiar with already, but they are reproduced here. To prioritize these 20 technologies as requested, we put them into three groups.

## CRITICAL TECHNOLOGIES PLAN

**Figure 4. CRITICAL TECHNOLOGIES PRIORITIZED IN THREE GROUPS**

| A | B | C |
|---|---|---|
| • COMPOSITE MATERIALS | • AIR BREATHING PROPULSION | • BIOTECHNOLOGY |
| • COMPUTATIONAL FLUID DYNAMICS | • MACHINE INTELLIGENCE & MATERIALS | • HIGH ENERGY DENSITY MATERIALS |
| • DATA FUSION | • PARALLEL COMPUTER ARCHITECTURES | • HYPERVELOCITY PROJECTILE |
| • PASSIVE SENSORS | • SENSITIVE RADARS | • PULSED POWER |
| • PHOTONICS | • SIGNATURE CONTROL | • SUPERCONDUCTIVITY |
| • SEMI-CONDUCTOR MATERIALS & MICROELECTRONIC CIRCUITS | • SIMULATION AND MODELING | |
| • SIGNAL PROCESSING | • WEAPON SYSTEM ENVIRONMENT | |
| • SOFTWARE PRODUCIBILITY | | |

NOTE: TECHNOLOGIES ARE LISTED IN ALPHABETICAL ORDER WITHIN EACH GROUP

I want to say, these 20 technologies selected are already the cream of all the technologies we have going on in the department, and we determined that it would be appropriate to have three groups, A being the highest and C the lowest.

We did not further prioritize within these groups, but I would like to comment that in the category of group A tend to be those technologies that are the most pervasive and have the most applications throughout weapons systems. In Group B tend to be primarily enabling technologies and in Group C emerging technologies. I think that is one reason why there might be disagreement with Dr. Mark on where biotechnology resides. It is not as pervasive yet in defense applications, and it is in a very early stage of reaching where we want it to go in the sense of bioengineering technology.

I would like to repeat some of the caveats which I mentioned last year.

## CRITICAL TECHNOLOGIES PLAN

Figure 5. CAVEATS

- CRITICAL TECHNOLOGIES ARE NOT THE ONLY IMPORTANT TECHNOLOGIES
  - THEY DO NOT EXIST IN ISOLATION
  - THERE ARE OTHER IMPORTANT TECHNOLOGIES
  - WHICH ARE DESCRIBED IN THE DOD S&T STRATEGY
- THEY ARE NOT TO BE CONFUSED WITH THE
  - "MILITARILY CRITICAL TECHNOLOGIES LIST" USED FOR EXPORT CONTROL PURPOSES
- FUNDING ESTIMATES ARE JUST THAT, NOT BUDGET NUMBERS
- PRIORITY GROUPINGS SHOULD NOT BE OVEREMPHASIZED

Number one, these are the 20 most critical technologies but certainly not the only important technologies. There are very many important technologies that were omitted from the list. These critical technologies cannot exist in isolation. They have to be part of the overall program, and we are developing now our overall Department of Defense science and technology strategy which will put all these things into perspective.

It is very important that this list not be confused with the militarily critical technologies list which is used to control export items.

The funding estimates that we give you are our best attempts to estimate the number of dollars that are going into each of these technologies, but they are not budget numbers. We do not budget our program or manage our program in this way, but we did attempt to consider specific technologies and not only in these areas in doing this.

Finally, the priority groupings, I think, should not be overemphasized. It is very important to recognize that we already have done a significant prioritization by selecting the 20.

# CRITICAL TECHNOLOGIES PLAN

Figure 6. TECHNOLOGIES LEFT OUT

SOME VERY IMPORTANT TECHNOLOGIES WERE LEFT OUT, E.G.,

- NUCLEAR WEAPONS TECHNOLOGY

AND ALSO

- TRAINING TECHNOLOGY
- MEDICAL R&D
- CHEMICAL AND BIOLOGICAL DEFENSE
- EYE PROTECTION AGAINST LASERS, ETC.

BECAUSE THEY AFFECT WEAPON SYSTEMS ONLY INDIRECTLY

Let me now go on to some of the technologies that we left out. Nuclear weapons technology was not included. We did not include any of the technologies which are being developed in the compartmented programs. We also omitted technologies which are very important. Certainly the training technology that Dr. Herzfeld referred to is very important, but it is not directly connected with military weapon systems. We omitted these basically on the premise that although they are important they do not directly affect weapon systems.

Now let me turn to a brief discussion of our investment strategy.

Figure 7. DERIVATION OF STRATEGIC GOALS IN INVESTMENT STRATEGY

We have derived strategic goals to guide us. These come from consideration of the national military strategy which is produced each year by the Joint Chiefs of Staff. From that, we have evolved our strategic plan and in so doing we identified strategic goals. This year we have currently identified 12 of the strategic goals.

# CRITICAL TECHNOLOGIES PLAN

**Figure 8. STRATEGIC GOALS**

- **DETERRENCE AND CONFLICT**
  - GOAL 1 — WEAPON SYSTEMS THAT CAN LOCATE, IDENTIFY, TRACK, AND TARGET STRATEGICALLY RELOCATABLE TARGETS
  - GOAL 2 — WORLDWIDE, ALL WEATHER FORCE PROJECTION CAPABILITY TO CONDUCT LIMITED WARFARE OPERATIONS (INCLUDING SPECIAL OPERATIONS FORCES AND LOW INTENSITY CONFLICT) WITHOUT THE REQUIREMENT FOR MAIN OPERATING BASES, INCLUDING A RAPID DEPLOYMENT FORCE THAT IS LOGISTICALLY INDEPENDENT FOR 30 DAYS
  - GOAL 3 — ELIMINATE THE THREAT POSED BY BALLISTIC MISSILES OF ALL RANGES, THROUGH NON-NUCLEAR METHODS
- **MILITARY SUPERIORITY**
  - GOAL 4 — AFFORDABLE, ON-DEMAND LAUNCH AND ORBIT TRANSFER CAPABILITIES FOR SPACE DEPLOYED ASSETS WITH ROBUST SURVIVABLE COMMAND AND CONTROL LINKS
  - GOAL 5 — REGAIN THE SUBSTANTIAL ANTISUBMARINE WARFARE ADVANTAGES THE UNITED STATES ENJOYED UNTIL RECENT YEARS
  - GOAL 6 — ACHIEVE WORLDWIDE, INSTANTANEOUS, SECURE, SURVIVABLE, AND ROBUST COMMAND, CONTROL, COMMUNICATIONS, AND INTELLIGENCE CAPABILITIES TO INCLUDE: (a) ON-DEMAND SURVEILLANCE OF SELECTED GEOGRAPHIC AREAS; (b) REAL TIME INFORMATION TRANSFER TO COMMAND AND CONTROL AUTHORITY; AND, (c) RESPONSIVE, SECURE COMMUNICATIONS FROM DECISION MAKERS FOR OPERATIONAL IMPLEMENTATION
  - GOAL 7 — WEAPON SYSTEMS AND PLATFORMS THAT DENY ENEMY TARGETING AND ALLOW PENETRATION OF ENEMY DEFENSES BY TAKING FULL ADVANTAGE OF SIGNATURE CONTROL AND ELECTRONIC WARFARE
  - GOAL 8 — ENHANCED, AFFORDABLE CLOSE COMBAT AND AIR DEFENSE SYSTEMS TO OVERMATCH THREAT SYSTEMS
  - GOAL 3 — AFFORDABLE "BRILLIANT WEAPONS" WHICH CAN AUTONOMOUSLY ACQUIRE, CLASSIFY, TRACK, AND DESTROY A BROAD SPECTRUM OF TARGETS (HARD FIXED, HARD MOBILE,COMMUNICATIONS NODES, ETC.)
- **AFFORDABILITY**
  - GOAL 10 — REDUCE OPERATIONS AND SUPPORT RESOURCE REQUIREMENTS BY 50 PERCENT WITHOUT IMPAIRING COMBAT CAPABILITY
  - GOAL 11 — REDUCE MANPOWER REQUIREMENT FOR A GIVEN MILITARY CAPABILITY BY 10 PERCENT OR MORE BY 2010
  - GOAL 12 — ENSURE THE AFFORDABILITY, PRODUCIBILITY, AND AVAILABILITY OF FUTURE WEAPONS SYSTEMS

We have grouped those into three categories, the first two being deterrence and conflict and the second one military superiority. These are in the plan, and I think you have already seen them, but you will recognize that these attempt to look 20 years into the future. If we are going to have military capabilities 20 years into the future, we are going to need the technology 10 to 15 years from now.

So it is our attempt, and that is all it is. It is an attempt to identify the types of weapon systems that will be important but not necessarily important today. We attempt to make these very specific.

You will notice that in number two we have the requirement that our force projection capability in the future will have to be logistically independent for 30 days, and that is a reflection of the fact that if we look at the current threat we have been looking at

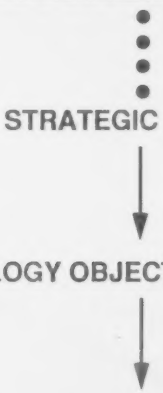
for the last 40 years or so, it has been largely a static threat which involves land conflict in Europe. We have not placed our significant infrastructure to support any forces that might participate in military actions. We could not be certain that in the future we will have similar infrastructure available to support forces that may go into action.

I must also caution that the fact that we identify these as goals does not mean that we think we can achieve them. These are very, very ambitious goals, and one of the things we are proceeding to do now is to investigate each of them in turn and develop plans, detailed implementation to address directly the question as to what is the opportunity for success.

The third goal is on this chart along with the second six of our strategic goals, and that, of course, is the affordability, a very important point. The 12th goal addresses particularly the affordability, the producibility and, again, the availability. By availability, again we mean not only that the systems will be there, but they are going to operate and be operable by the people who have to use them in the field where they have to use them.

## CRITICAL TECHNOLOGIES PLAN

Figure 9. CRITICAL TECHNOLOGIES FROM STRATEGIC GOALS




Now the next chart will illustrate in a sense how we would like to see these critical technologies derived. We have listed 12 strategic goals. To support those 12 strategic goals we have identified almost 200 technology objectives which, in our judgment and the judgment of the group that put this together, are required to support the achievement of those goals. So out of those we have further selected 20 which represent the most critical technologies.

I may give you a mistaken impression that this is actually the way we did it, but, of course, it is not. These two activities went on

independent of each other for most of the year, and it was only at the end of the year that we were able to compare the results and to be certain that we had not made any significant error in either one. I feel that it is correct.

## CRITICAL TECHNOLOGIES PLAN

Figure 10. REVISED TITLES ON THE LIST OF CRITICAL TECHNOLOGIES

BY:

- COMBINING 2 PAIRS OF CLOSELY RELATED TECHNOLOGIES:
  - SEMICONDUCTOR MATERIALS AND MICROELECTRONIC CIRCUITS
  - PHOTONICS (FOR: INTEGRATED OPTICS AND FIBER OPTICS)
- REPLACING A "CRITICAL NEED" WITH A CRITICAL TECHNOLOGY:
  - SIGNAL PROCESSING (FOR: AUTOMATIC TARGET RECOGNITION)
- REMOVING 2 TITLES:
  - HIGH POWER MICROWAVES UNDER PULSED POWER
  - PHASED ARRAYS UNDER SIGNAL PROCESSING
- ADDING 2 NEW TECHNOLOGIES:
  - WEAPON SYSTEM ENVIRONMENT
  - HIGH ENERGY DENSITY MATERIALS

Now just briefly to summarize the critical technologies and explain the differences between this year's list and last year's list.

We combined two pairs this year of closely related technologies, and these are given here. The semiconductor materials and microelectronic circuits is a combination of two of them from last year. We also combined integrated optics and fiber optics into one photonics.

Last year we had automatic target recognition as a critical technology, and I think at the time that I discussed the plan with this committee I said that was really not a technology. It is more of a need, a critical technology need, rather than a technology itself. So this year we have put that into signal processing.

We did remove two titles, high power microwaves, which is included now under pulsed power, and phased arrays, which is also included under signal processing.

We added two new technologies this year, weapons system environment and high energy density materials.

The important point here is that we went through this very carefully, and in each of these discussions, as Dr. Herzfeld has already mentioned, you will notice that we have for each of the technologies discussed the manufacturing capabilities. We will continue to expand this portion of our plan, and we also are going to continue to search for basic technologies which will strengthen our manufacturing base.

I would like to say that we are looking for technologies that are to manufacturing as sensors are to air defense technology. We are

looking for specific critical technologies, and we did identify in many cases where these 20 critical technologies will be important for manufacturing capability. These are primarily computing and software technologies which will support planning and scheduling.

With that, I would like to pass the baton back to Dr. Herzfeld.

[The prepared statement of Dr. Millburn follows:]

DR. GEORGE MILLBURN
DEPUTY DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING
(RESEARCH AND ADVANCED TECHNOLOGY)

STATEMENT ON THE
CRITICAL TECHNOLOGIES PLAN

GOOD MORNING MR. CHAIRMAN, SENATORS, LADIES AND GENTLEMEN.

I AM HAPPY TO BE HERE WITH DR. HERZFELD TO EXPLAIN THE PROCEDURE WE USED TO DEVELOP THIS YEAR'S CRITICAL TECHNOLOGIES PLAN. PUBLIC LAW 101-189 REQUIRES THE DEPARTMENT OF DEFENSE IN CONSULTATION WITH THE DEPARTMENT OF ENERGY TO SUBMIT AN ANNUAL PLAN FOR DEVELOPING THE 20 TECHNOLOGIES CONSIDERED MOST CRITICAL TO ENSURING THE LONG-TERM QUALITATIVE SUPERIORITY OF UNITED STATE WEAPON SYSTEMS. WE ESTABLISHED A STEERING COMMITTEE WHICH INCLUDED THE SENIOR MANAGERS OF THE DOD SCIENCE AND TECHNOLOGY PROGRAM FROM THE ARMY, NAVY, AIR FORCE, DEFENSE ADVANCED RESEARCH PROJECT AGENCY, THE DEFENSE NUCLEAR AGENCY AND THE OFFICE OF THE ASSISTANT SECRETARY FOR DEFENSE PROGRAMS IN THE DEPARTMENT OF ENERGY. WE ESTABLISHED A WORKING GROUP GENERALLY CONSISTING OF THE SENIOR SUBORDINATES OF THE STEERING COMMITTEE MEMBERS BUT ALSO INCLUDING THE DEFENSE INTELLIGENCE AGENCY, THE STRATEGIC DEFENSE INITIATIVE OFFICE, AND THE THREE DOE NATIONAL LABORATORIES DIRECTLY CONCERNED WITH WEAPONS TECHNOLOGY. THIS WAS THE SAME PROCEDURE WE USED LAST YEAR (FIGURE 1).

THE STEERING COMMITTEE MET PERIODICALLY, APPROXIMATELY MONTHLY, TO REVIEW PROGRESS AND GIVE GUIDANCE TO THE WORKING GROUP. SELECTION CRITERIA WERE MODIFIED BY ADDING A THIRD PAIR, PERVASIVENESS FACTORS. WEIGHT WAS GIVEN TO TECHNOLOGIES WITH WIDE APPLICABILITY TO WEAPONS SYSTEM AND TO POTENTIAL SPIN OFF OR ON TO THE DEFENSE INDUSTRIAL BASE (FIGURE 2).

THE SELECTION OF 20 CRITICAL TECHNOLOGIES WAS CLOSELY

FOLLOWED BY THE STEERING COMMITTEE AND THE PRIORITIZATION WAS DETERMINED BY THE COMMITTEE BASED ON RECOMMENDATIONS OF THE WORKING GROUP. SINCE THESE 20 TECHNOLOGIES (FIGURE 3) ARE ALREADY THE CREAM OF OUR PROGRAMS, WE DETERMINED A GROUPING INTO THREE CATEGORIES WITH "A" BEING THE HIGHEST AND "C" THE LOWEST. WE DID NOT FURTHER PRIORITIZE WITHIN GROUPS. IT IS INTERESTING TO NOTE THAT THE TECHNOLOGIES IN GROUP "A" TEND TO BE THE MOST PERVASIVE, THOSE IN GROUP B, PRIMARILY ENABLING TECHNOLOGIES, AND THOSE IN GROUP C, EMERGING TECHNOLOGIES (FIGURE 4).

I WOULD LIKE TO REPEAT SOME CAVEATS CONCERNING THE PROCESS AND THE SELECTION OF THE 20 TECHNOLOGIES (FIGURE 5). WE DID NOT CONSIDER TECHNOLOGIES BEING DEVELOPED BY COMPARTMENTED PROGRAMS, NOR DID WE INCLUDE NUCLEAR WEAPONS TECHNOLOGY. THE FUNDING NUMBERS GIVEN WERE OUR BEST EFFORTS BUT ARE NOT "BUDGET" NUMBERS SINCE WE DO NOT BUDGET OR MANAGE THE S&T PROGRAM BY TECHNOLOGIES. ONCE AGAIN WE ATTEMPTED TO CONSIDER SPECIFIC TECHNOLOGIES AND NOT TECHNOLOGY AREAS, THAT IS, SENSORS NOT AIR DEFENSE TECHNOLOGY FOR EXAMPLE. THESE ARE NOT THE ONLY IMPORTANT TECHNOLOGIES AND COULD NOT BE EFFECTIVELY APPLIED WITHOUT OTHER TECHNOLOGIES BEING DEVELOPED IN THE S&T PROGRAM; AUTOMATIC TARGET RECOGNITION IS OF NO USE WITHOUT WEAPONS TO ATTACK AND DESTROY THE TARGETS, FOR EXAMPLE. THE OVERALL INVESTMENT STRATEGY OF THE S&T PROGRAM WILL PUT THESE OTHER TECHNOLOGIES INTO BETTER CONTEXT WITH THE 20 CRITICAL ONES. SOME TECHNOLOGIES ARE MISSING BECAUSE THEY ARE NOT DIRECTLY WEAPON TECHNOLOGIES ALTHOUGH THEY MAY BE ESSENTIAL TO PROPER UTILIZATION OF THE CRITICAL TECHNOLOGIES, SIMULATION AND TRAINING FOR EXAMPLE (FIGURE 6).

THESE CRITICAL TECHNOLOGIES SHOULD NOT BE CONFUSED WITH THE MILITARILY CRITICAL TECHNOLOGIES LIST WHICH IS USED TO CONTROL

THE EXPORT OF TECHNOLOGIES.

IN FUTURE YEARS WE HOPE TO TIE THE SELECTION OF THE CRITICAL TECHNOLOGIES TO AN OVERALL STRATEGY FOR THE S&T PROGRAM - WHAT WE CALL THE S&T INVESTMENT STRATEGY. THIS PLAN BEGINS WITH THE NATIONAL MILITARY STRATEGY AND OUR VISION OF DESIRED MILITARY CAPABILITIES 20 YEARS OR SO IN THE FUTURE (FIGURE 7). WE THEN DEVELOP MAJOR GOALS AND IN OUR FIRST ATTEMPT IDENTIFIED 12 WHICH WE GROUPED INTO THREE CATEGORIES: DETERRENCE, MILITARY SUPERIORITY AND AFFORDABILITY (FIGURE 8).

WE IDENTIFIED NEARLY 200 TECHNOLOGY OBJECTIVES AS REQUIRED TO PERMIT ACHIEVEMENT OF THESE 12 MAJOR GOALS (FIGURE 9). THIS YEAR THE INVESTMENT STRATEGY AND THE CRITICAL TECHNOLOGIES PLAN WERE DEVELOPED INDEPENDENTLY AND COMPARED ONLY NEAR THE END OF THEIR DEVELOPMENTS. WE HOPE IN THE FUTURE TO DEVISE A METHOD TO SELECT THE CRITICAL TECHNOLOGIES FROM THE FUTURE MILITARY CAPABILITIES IN A MORE DIRECT MANNER. EVEN SO, THE SELECTION PROCESS WILL DEPEND GREATLY ON JUDGMENT.

IT WAS THEREFORE REASSURING THAT AN INDEPENDENT INDUSTRY REVIEW OF LAST YEAR'S PLAN WAS FAVORABLE. AT OUR REQUEST, THREE DEFENSE INDUSTRIAL ASSOCIATIONS, THE NATIONAL SECURITY INDUSTRIAL ASSOCIATION, THE ELECTRONICS INDUSTIES ASSOCIATION AND THE AEROSPACE INDUSTRIES ASSOCIATION, JOINTLY QUERIED THEIR MEMBER COMPANIES CONCERNING OUR PLAN. THERE WERE MINOR DISAGREEMENTS, BUT OVERALL THE AGREEMENT WAS SURPRISINGLY STRONG. WE HOPE TO CONTINUE THIS COOPERATION AND OVER TIME DEVELOP PROCEDURES WHICH WILL PERMIT CLOSER COOPERATION WITH THE DEFENSE INDUSTRIAL BASE. WE ARE ALSO SEEKING WAYS TO OBTAIN A SIMILAR LEVEL OF COOPERATION AND PARTICIPATION WITH THE ACADEMIC COMMUNITY.

WE SURVEYED THE OTHER FEDERAL AGENCIES WHO HAVE RESPONSIBILITIES FOR DEVELOPING TECHNOLOGY. AGAIN THEIR CONTRIBUTIONS WERE MAINLY USEFUL IN REVIEWING OUR LIST FOR COMPLETENESS.

YOU WILL NOTICE THAT THIS YEAR EACH DESCRIPTION OF A CRITICAL TECHNOLOGY INCLUDES DISCUSSION OF MANUFACTURING CAPABILITIES. WE WILL CONTINUE TO EXPAND THIS PORTION OF OUR PLAN AND WILL ALSO CONTINUE TO SEARCH FOR BASIC TECHNOLOGIES WHICH WILL STRENGTHEN OUR MANUFACTURING BASE. OUR ATTEMPTS TO DO SO THIS YEAR WERE AGAIN NOT FRUITFUL.

THIS YEAR'S LIST OF CRITICAL TECHNOLOGIES IS NOT VERY DIFFERENT FROM LAST YEAR'S LIST. WE COMBINED TWO PAIRS FROM LAST YEAR BECAUSE THE TECHNOLOGIES ARE CLOSELY RELATED. "SEMICONDUCTOR MATERIALS AND MICROELECTRONIC CIRCUITS" COMBINED TWO TECHNOLOGIES ON LAST YEAR'S LIST, ONE ON "MICROELECTRONIC CIRCUITS" AND ONE ON "GALLIUM ARSENIDE AND OTHER COMPOUND SEMICONDUCTORS." THE OTHER, "PHOTONICS," COMBINED INTEGRATED OPTICS AND FIBER OPTICS. WE REPLACED "AUTOMATIC TARGET RECOGNITION," WHICH WE CHARACTERIZED AS A TECHNOLOGY NEED, WITH "SIGNAL PROCESSING," WHICH IS THE BASIC TECHNOLOGY MOST IMPORTANT FOR DEVELOPING THE NEED. WE REMOVED TWO TITLES, "HIGH POWER MICROWAVES" IS NOW INCLUDED IN "PULSED POWER" AND "PHASED ARRAYS" IN "SIGNAL PROCESSING." TWO TECHNOLOGIES WERE ADDED THIS YEAR: "WEAPON SYSTEM ENVIRONMENT" AND "HIGH ENERGY DENSITY MATERIALS" (FIGURE 10).

DR. HERZFELD WILL NOW DISCUSS EACH OF THE CRITICAL TECHNOLOGIES IN THE PLAN.

# CRITICAL TECHNOLOGIES PLAN

**Figure 1. THE PARTICIPANTS**

STEERING COMMITTEE: SENIOR S&T MANAGERS FROM DOD, SERVICES, DOE

WORKING GROUP: OSD (CHAIRMANSHIP)
ARMY
NAVY
AIR FORCE
DARPA
DIA
DNA
SDIO

DOE HEADQUARTERS

DOE NATIONAL LABORATORIES:
LAWRENCE LIVERMORE
LOS ALAMOS
SANDIA

**Figure 2. SELECTION CRITERIA**

| (1) PERFORMANCE FACTORS | (2) QUALITY DESIGN FACTORS | (3) PERVASIVENESS FACTORS |
|---|---|---|
| • Enhanced Performance of Weapon Systems | • Improved Availability and Dependability of Weapon Systems | • Wide Applicability to Weapon Systems |
| • New Military Capabilities | • Improved Affordability of Weapon Systems | • Spin-off/on to Industrial Base |

# CRITICAL TECHNOLOGIES PLAN

## Figure 3. LIST OF CRITICAL TECHNOLOGIES

- SEMICONDUCTOR MATERIALS & MICROELECTRONIC CIRCUITS
- SOFTWARE PRODUCIBILITY
- PARALLEL COMPUTER ARCHITECTURES
- MACHINE INTELLIGENCE / ROBOTICS
- SIMULATION AND MODELING
- PHOTONICS
- SENSITIVE RADARS
- PASSIVE SENSORS
- SIGNAL PROCESSING
- SIGNATURE PROCESSING
- WEAPON SYSTEM ENVIRONMENT
- DATA FUSION
- COMPUTATIONAL FLUID DYNAMICS
- AIR BREATHING PROPULSION
- PULSED POWER
- HYPERVELOCITY PROJECTILES
- HIGH ENERGY DENSITY MATERIALS
- COMPOSITE MATERIALS
- SUPERCONDUCTIVITY
- BIOTECHNOLOGY MATERIALS & PROCESSES

## Figure 4. CRITICAL TECHNOLOGIES PRIORITIZED IN THREE GROUPS

**A**

- COMPOSITE MATERIALS
- COMPUTATIONAL FLUID DYNAMICS
- DATA FUSION
- PASSIVE SENSORS
- PHOTONICS
- SEMI -CONDUCTOR MATERIALS & MICROELECTRONIC CIRCUITS
- SIGNAL PROCESSING
- SOFTWARE PRODUCIBILITY

**B**

- AIR BREATHING PROPULSION
- MACHINE INTELLIGENCE & MATERIALS
- PARALLEL COMPUTER ARCHITECTURES
- SENSITIVE RADARS
- SIGNATURE CONTROL
- SIMULATION AND MODELING
- WEAPON SYSTEM ENVIRONMENT

**C**

- BIOTECHNOLOGY
- HIGH ENERGY DENSITY MATERIALS
- HYPERVELOCITY PROJECTILE
- PULSED POWER
- SUPERCONDUCTIVITY

NOTE: TECHNOLOGIES ARE LISTED IN ALPHABETICAL ORDER WITHIN EACH GROUP

# CRITICAL TECHNOLOGIES PLAN

Figure 5. CAVEATS

- CRITICAL TECHNOLOGIES ARE NOT THE ONLY IMPORTANT TECHNOLOGIES
  - THEY DO NOT EXIST IN ISOLATION
  - THERE ARE OTHER IMPORTANT TECHNOLOGIES
  - WHICH ARE DESCRIBED IN THE DOD S&T STRATEGY
- THEY ARE NOT TO BE CONFUSED WITH THE
  - "MILITARILY CRITICAL TECHNOLOGIES LIST" USED FOR EXPORT CONTROL PURPOSES
- FUNDING ESTIMATES ARE JUST THAT, NOT BUDGET NUMBERS
- PRIORITY GROUPINGS SHOULD NOT BE OVEREMPHASIZED

Figure 6. TECHNOLOGIES LEFT OUT

SOME VERY IMPORTANT TECHNOLOGIES WERE LEFT OUT, E.G.,

- NUCLEAR WEAPONS TECHNOLOGY

AND ALSO

- TRAINING TECHNOLOGY
- MEDICAL R&D
- CHEMICAL AND BIOLOGICAL DEFENSE
- EYE PROTECTION AGAINST LASERS, ETC.

BECAUSE THEY AFFECT WEAPON SYSTEMS ONLY INDIRECTLY

Figure 7. DERIVATION OF STRATEGIC GOALS IN INVESTMENT STRATEGY

Figure 8. STRATEGIC GOALS

- DETERRENCE AND CONFLICT
  - GOAL 1 — WEAPON SYSTEMS THAT CAN LOCATE, IDENTIFY, TRACK, AND TARGET STRATEGICALLY RELOCATABLE TARGETS
  - GOAL 2 — WORLDWIDE, ALL WEATHER FORCE PROJECTION CAPABILITY TO CONDUCT LIMITED WARFARE OPERATIONS (INCLUDING SPECIAL OPERATIONS FORCES AND LOW INTENSITY CONFLICT) WITHOUT THE REQUIREMENT FOR MAIN OPERATING BASES, INCLUDING A RAPID DEPLOYMENT FORCE THAT IS LOGISTICALLY INDEPENDENT FOR 30 DAYS
  - GOAL 3 — ELIMINATE THE THREAT POSED BY BALLISTIC MISSILES OF ALL RANGES, THROUGH NON-NUCLEAR METHODS
- MILITARY SUPERIORITY
  - GOAL 4 — AFFORDABLE, ON-DEMAND LAUNCH AND ORBIT TRANSFER CAPABILITIES FOR SPACE DEPLOYED ASSETS WITH ROBUST SURVIVABLE COMMAND AND CONTROL LINKS
  - GOAL 5 — REGAIN THE SUBSTANTIAL ANTISUBMARINE WARFARE ADVANTAGES THE UNITED STATES ENJOYED UNTIL RECENT YEARS
  - GOAL 6 — ACHIEVE WORLDWIDE, INSTANTANEOUS, SECURE, SURVIVABLE, AND ROBUST COMMAND, CONTROL, COMMUNICATIONS, AND INTELLIGENCE CAPABILITIES TO INCLUDE: (a) ON-DEMAND SURVEILLANCE OF SELECTED GEOGRAPHIC AREAS; (b) REAL TIME INFORMATION TRANSFER TO COMMAND AND CONTROL AUTHORITY; AND, (c) RESPONSIVE, SECURE COMMUNICATIONS FROM DECISION MAKERS FOR OPERATIONAL IMPLEMENTATION

# CRITICAL TECHNOLOGIES PLAN

**Figure 8. STRATEGIC GOALS (CONT.)**

- **MILITARY SUPERIORITY (CONT.)**
  - GOAL 7 — WEAPON SYSTEMS AND PLATFORMS THAT DENY ENEMY TARGETING AND ALLOW PENETRATION OF ENEMY DEFENSES BY TAKING FULL ADVANTAGE OF SIGNATURE CONTROL AND ELECTRONIC WARFARE
  - GOAL 8 — ENHANCED, AFFORDABLE CLOSE COMBAT AND AIR DEFENSE SYSTEMS TO OVERMATCH THREAT SYSTEMS
  - GOAL 3 — AFFORDABLE "BRILLIANT WEAPONS" WHICH CAN AUTONOMOUSLY ACQUIRE, CLASSIFY, TRACK, AND DESTROY A BROAD SPECTRUM OF TARGETS (HARD FIXED, HARD MOBILE,COMMUNICATIONS NODES, ETC.)
- **AFFORDABILITY**
  - GOAL 10 — REDUCE OPERATIONS AND SUPPORT RESOURCE REQUIREMENTS BY 50 PERCENT WITHOUT IMPAIRING COMBAT CAPABILITY
  - GOAL 11 — REDUCE MANPOWER REQUIREMENT FOR A GIVEN MILITARY CAPABILITY BY 10 PERCENT OR MORE BY 2010
  - GOAL 12 — ENSURE THE AFFORDABILITY, PRODUCIBILITY, AND AVAILABILITY OF FUTURE WEAPONS SYSTEMS

**Figure 9. CRITICAL TECHNOLOGIES FROM STRATEGIC GOALS**

## CRITICAL TECHNOLOGIES PLAN

Figure 10. REVISED TITLES ON THE LIST OF CRITICAL TECHNOLOGIES

BY:

- COMBINING 2 PAIRS OF CLOSELY RELATED TECHNOLOGIES:
  - SEMICONDUCTOR MATERIALS AND MICROELECTRONIC CIRCUITS
  - PHOTONICS (FOR: INTEGRATED OPTICS AND FIBER OPTICS)
- REPLACING A "CRITICAL NEED" WITH A CRITICAL TECHNOLOGY:
  - SIGNAL PROCESSING (FOR: AUTOMATIC TARGET RECOGNITION)
- REMOVING 2 TITLES:
  - HIGH POWER MICROWAVES UNDER PULSED POWER
  - PHASED ARRAYS UNDER SIGNAL PROCESSING
- ADDING 2 NEW TECHNOLOGIES:
  - WEAPON SYSTEM ENVIRONMENT
  - HIGH ENERGY DENSITY MATERIALS

It was very important to describe what was done, and equally important that Dr. Millburn have the chance to do this, because, of course, it was done under his direction. I was not involved except at the very end.

I would like to talk a little more about the plan itself, what it means, and what some of the findings are. The next Vugraph shows some of the principal features.

## CRITICAL TECHNOLOGIES PLAN

Figure 5. PRINCIPAL FEATURES OF THE PLAN

- LINKS CRITICAL TECHNOLOGIES TO DOD SCIENCE AND TECHNOLOGY STRATEGY
- SELECTS 20 CRITICAL TECHNOLOGIES
- PRIORITIZES THEM
- PROVIDES FUNDING ESTIMATES
- INDICATES MILESTONES TO 2005
- PROVIDES INTERNATIONAL COMPARISONS
- INCLUDES INDUSTRIAL BASE AND MANUFACTURING ISSUES

Some of this repeats things that have been said, and so I do not wish to dwell on this.

An important feature is providing the international comparisons, the second bullet from the bottom, which is a very difficult thing to do. And it is almost guaranteed to start an argument with almost everyone in the room because we all have views about this, and these views are rarely consistent.

A very deliberate attempt was made to make careful, moderate and middle-of-the-road judgments about the relative standings of different countries, with respect to the United States in the 20 critical technologies.

Each technology, of course, is a sufficiently rich subject so that in the smaller sub-pieces of it there might be outstanding capability in some country and in other places within the same critical technology there might be tremendous gaps in the same country, so everyone can give a good example or a counter example on either side of an argument.

The group tried to make overall judgments because they were convinced, and I am convinced they are right, that it is very important for our own thinking. Therefore, I asked them to share with you, the Congress, how we view the international competitiveness of our critical technologies. Not only, of course, from a military point of view, but also from a general commercial point of view.

Much more work needs to be done on this, and it needs to be done in technologies that are not primarily concerned with the Defense Department, but that clearly is not our mission to do, at least only in a very limited way. We need to be aware of it, but it is not part of our statutory responsibility.

But for the areas where we are really responsible, we thought it was important to highlight this as a particular feature.

## CRITICAL TECHNOLOGIES PLAN

Figure 6. SUBJECTS ADDRESSED IN THE REPORT

- DESCRIPTION OF THE TECHNOLOGY
- PAYOFF
- S&T PROGRAMS
- RELATED MANUFACTURING CAPABILITY
- R&D IN THE UNITED STATES
- INTERNATIONAL ASSESSMENT

The next chart begins to take us into the heart of the matter.

The following Vugraphs will show the description of the technologies. The report shows what the payoff is, what the science and technology programs are that relate to it, the related manufacturing capability, other on-going R&D in the United States, and the international assessment.

This is done technology by technology. It takes, typically, 10 or 12 pages for each to go through. You must, of course, realize that the report has come out in a highly summarized format. There are literally mountains of paper and reports behind or below it, as it were, that back this up in some manner.

So we tried to spare you all of that, and we are trying here to show you only the tip of the iceberg to make the discussions more efficient.

# CRITICAL TECHNOLOGIES PLAN

## Figure 7. TECHNOLOGY OBJECTIVES

- SEMICONDUCTOR MATERIALS AND MICROELECTRONIC CIRCUITS:
  - — HIGH-SPEED COMPUTING AND SIGNAL PROCESSING, AUTOMATIC CONTROL, SENSITIVE RECEIVERS, MILLIMETER WAVE RADAR, PHOTONICS
- SOFTWARE PRODUCIBILITY:
  - — AFFORDABLE, TRUSTED SOFTWARE, AUTOMATIC SOFTWARE GENERATION, REUSABLE SOFTWARE
- PARALLEL COMPUTER ARCHITECTURES:
  - — ULTRA-HIGH-SPEED COMPUTING
- MACHINE INTELLIGENCE AND ROBOTICS:
  - — BUILD HUMAN INTELLIGENCE INTO MECHANICAL DEVICES, MANUFACTURING, MAINTENANCE
- SIMULATION AND MODELING:
  - — TESTING CONCEPTS AND DESIGNS WITHOUT EXPENSIVE REPLICAS, TRAINING FOR COMPLEX MILITARY SCENARIOS
- PHOTONICS:
  - — ULTRA-HIGH-DENSITY MEMORIES AND HIGH-VOLUME, HIGH-SPEED INFORMATION PROCESING,
- SENSITIVE RADARS:
  - — NON-COOPERATIVE TARGET IDENTIFICATION, DETECTION OF LOW-OBSERVABLE TARGETS
- PASSIVE SENSORS:
  - — SILENT SENSING OF TARGETS OR ENVIRONMENT, MONITORING EQUIPMENT (CONDITION SENSING)
- SIGNAL PROCESSING:
  - — PROCESSING SIGNALS FOR INFORMATION EXTRACTION, AUTOMATIC TARGET DETECTION/TRACKING/CLASSIFICATION/RECOGNITION
- SIGNATURE CONTROL:
  - — CONTROLLING PLATFORM OR WEAPON SIGNATURES (RADAR, OPTICAL, ACOUSTIC, ETC.) TO ENHANCE THEIR SURVIVABILITY
- WEAPON SYSTEM ENVIRONMENT:
  - — UNDERSTANDING OR PREDICTING THE BEHAVIOR OF THE ENVIRONMENT TO ENHANCE WEAPON EFFECTIVENESS
- DATA FUSION:
  - — COMBINING AND INTERPRETING DATA FROM SEVERAL SOURCES AND PRESENTING IT IN A CONVENIENT FORM TO THE HUMAN OPERATOR
- COMPUTATIONAL FLUID DYNAMICS:
  - — MODELING OF COMPLEX FLUID FLOW TO MAKE DEPENDABLE PREDICTIONS BY COMPUTING, THUS OBVIATING EXPENSIVE FACILITIES AND EXPERIMENTS

# CRITICAL TECHNOLOGIES PLAN

**Figure 7. TECHNOLOGY OBJECTIVES (CONT.)**

- AIR BREATHING PROPULSION:
  - — LIGHT-WEIGHT, FUEL EFFICIENT ENGINES
- PULSED POWER:
  - — COMPACT, LIGHT-WEIGHT, LOW-VOLUME DEVICES FOR HIGH-POWER MICROWAVES, HIGH-ENERGY LASERS, ELECTROTHERMAL GUNS, RADARS, ELECTROMAGNETIC LAUNCHERS, PARTICLE BEAMS
- HYPERVELOCITY PROJECTILES:
  - — TO PENETRATE HARDENED TARGETS
- HIGH ENERGY DENSITY MATERIALS:
  - — SAFE, TRANSPORTABLE, EFFICIENT ENERGETIC MATERIALS FOR EXPLOSIVES AND PROPELLANTS
- COMPOSITE MATERIALS:
  - — HIGH-TEMPERATURE, HIGH-STRENGTH, LIGHT-WEIGHT COMPOSITE MATERIALS FOR AEROSPACE APPLICATIONS
- SUPERCONDUCTIVITY:
  - — FABRICATION AND EXPLOITATION OF SUPERCONDUCTING MATERIALS
- BIOTECHNOLOGY:
  - — SYSTEMATIC APPLICATION OF BIOLOGY IN MILITARY ENGINEERING OR MEDICINE

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The next Vugraph begins the list.

It is important to recognize at the outset that almost all of these 20 technologies have enormous spinoff potential for commercial use. You will see that, and I will try to highlight a few as we go through this.

Certainly, semiconductor materials and microelectronic circuits are examples of this. It is true that the needs of the military are different in some subtle ways from the commercial needs, in various ways, for example, much military hardware does need to be resistant to nuclear radiation if it is to function in a nuclear war environment. Clearly, this is not a great objective for commercial electronics.

Other equipments need to be built in such a way that they do not radiate any of the information processing that is going on inside, the so-called Tempest requirement, which makes the equipment much more expensive.

Military equipment occasionally gets thrown off a truck, and you would like it to work afterwards. The VCR you have at home is really not something you plan to throw out of your second-story window.

So there are important differences that do increase the cost and do increase the complexity. And that puts somewhat of a limit on the commercial purchase of some of the equipment, though there is of course vast room for improvement on that subject.

Software producibility, particularly automated software generation, essential for the DOD, has enormous potential commercial value. We will increasingly be surrounded by complex real-time programs that run all kinds of things, from communications to air traffic control.

To build these programs efficiently, in a manner that reduces the number of mistakes in them, and makes them provably correct, as the technical phrase goes, is a very important goal. And the closer we get to that, the better off the whole country will be.

Parallel computer architectures is a very important area. There is a subtle difference in emphasis between Hans Mark and me on this one. My own view about parallel computer architectures is that it is a very new territory, and that no one yet knows really what kinds of architectures are best for solving what kinds of problems.

In a sense, I see choice of computer architecture as an experimental problem, where you try to solve complex problems and try to find computer architectures that address some aspect of these problems, particularly well.

I think we are far from knowing enough that we can tell what is there. But the fact that many companies that build these machines are quite successful commercially, is an interesting commentary on the importance of the field.

Machine intelligence and robotics also has a lot to do with manufacturing, with maintenance, and with assisting humans doing complex jobs.

The pilot's associate that helps a fighter pilot fly his airplane enabling him to concentrate on his fight, and not having to manage absolutely everything that goes on in the flying machine, but have an intelligent program with a powerful computer do that managing, is a very important matter. It, too, will eventually have spinoff for the commercial world.

I do not think I need to go through absolutely every one of these examples, Mr. Chairman, unless you would like me to. But this gives you an idea of how we are looking at this and where we think all of this is going.

Dr. Millburn has explained very well the basic choices that were made and how they were made. And so, with your permission, I will go on and pass over the next two charts which are more detailed.

# CRITICAL TECHNOLOGIES PLAN

## Figure 8. FOREIGN TECHNOLOGICAL CAPABILITIES

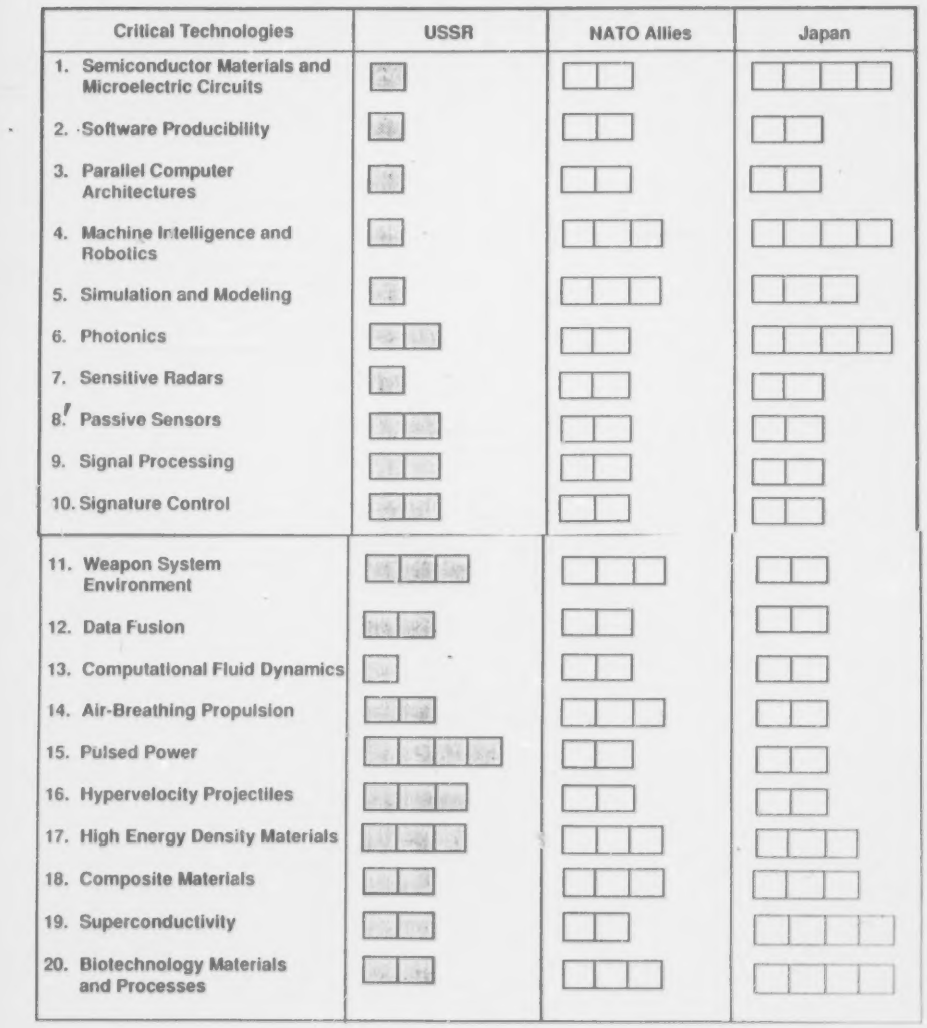


Figure 8 shows an example of how the technological comparisons run.

Figure 8. FOREIGN TECHNOLOGICAL CAPABILITIES (CONT.)

LEGEND:

| POSITION OF THE USSR RELATIVE TO THE UNITED STATES | CAPABILITY OF OTHERS TO CONTRIBUTE TO THE TECHNOLOGY |
|---|---|
| Significant leads in some niches of technology | Significantly ahead in some niches of technology |
| Generally on a par with the United States | Capable of making major contributions |
| Generally lagging except in some areas | Capable of making some contributions |
| Lagging in all important aspects | Unlikely to make any immediate contribution |

This shows the key. The technology where any country is listed as having four boxes means that the country may be significantly ahead of this country in some niches of this particular technology.

Three boxes means generally on a par, but able to make significant contributions and compete in significant niches.

Two boxes means generally lagging, but able to make respectable contributions.

And one box means that they are hardly in the ball game.

Now if you can go back to the first of the Figure 8 viewgraph.

I do not propose to go through all of these, because you have seen them and you can ask questions. If we pick, for example, the semiconductor materials and microelectronic circuits, it is true that, with a few very minor exceptions, the Soviet Union is not anywhere near where we are. And the argument can be made that they are falling behind in this.

Now it is likely that the opening of trade in high technology, which is bound to happen, will help the Soviets catch up. They have been in a catch-up mode in a number of technologies over the last 20 to 30 years. They have made great strides in some of them in the last 10 years. And this can be expected to continue.

In this area, I think we can be reasonably comfortable so far.

Our NATO allies have significant capabilities. They are not as far as we are in this, but they can clearly help.

Japan clearly has a dominating position here, built over many decades. It is important to point out that it is no accident that this happened. It is the result of a conscious decision by organizations in the Japanese Government and in the private sector to achieve this strong position.

And on this hangs the issue that I will touch on at this time, and you can come back to it if you like, namely concerning our dependence on foreign sources for certain key, critical components. DARPA has been studying this, and this will need to be addressed in the context of our technology strategy which we plan to do.

It is something that we need to come to grips with. We need to have a feeling for what the serious threat really is, and what is only a measure of discomfort that we can probably live with. It is a significant matter.

In simulation modeling, for example, the Soviet Union is not very strong, though I would point out that there is a branch of applied mathematics which used to be called cybernetics, in which the Soviets have been very interested for a long time. They have done very good theoretical work. It has not found its way into applications yet, but is bound to at some stage.

The investment they have made in some of the foundations of the subject will pay off when they get the ability to implement some of their ideas.

Both our NATO allies and Japan are roughly on a par with our own capabilities. Though, of course, in a related area, machine intelligence, and particularly robotics, Japan has a generally stronger position than we have.

Let me refer to figure 8. Number 15, pulsed power, drew a certain amount of public attention the other day, and caused a certain number of questions inside our building: How come? And what does it mean?

The high pulse power capability, which is quite large in the Soviet Union, has some important military applications. I am reluctant to discuss these in an open session, but the technology is there for a real reason. Needless to say, we are sometimes confronted with situations like this, and we plan to do something about it. That, again, is something that should not be addressed in an open session right now, but we would be happy to discuss it in an appropriate closed session or privately if you like.

High energy density materials is an interesting one. It is an attempt to find materials that have more energy than, say, gasoline, which is really near the top, or high explosives of the ordinary kind. This is important both from a fuel and from a high explosives point of view.

It is, to some, kind of the holy grail in materials technology. I am personally a little bit cautious and skeptical. I worked on one version of this technology 30 years ago, and we did not do very well. It is hard to do. If it were really feasible, I think it would be very interesting to have. So it is important, and it is being worked on.

Superconductivity is going to be very important in some very special applications for military purposes. I do not believe that high temperature superconductivity is just around the corner. There is a large research program called for, some of which is supported by the Defense Department; I think more by DOE and NSF (National Science Foundation), and appropriately so.

Low temperature superconductivity has some immediate applications for computing, for fast switching, and for other things, and there are significant DOD programs in that area. It is not the philosophers' stone, either. It is not the solution to all of these problems, but it is important. I fully agree that it must be on the list, and that we need to be active in it.

That completes my summary of this part of the report.

## CRITICAL TECHNOLOGIES PLAN

**Figure 9. FUTURE PLANS**

- ORGANIZE WITHIN DOD TO DEVELOP TECHNOLOGY STRATEGY AND ACTION PLAN
- TIE TO THIS INVESTMENT STRATEGY AND THE CRITICAL TECHNOLOGIES PLAN, IN A COHERENT FASHION
- TASK THE LEAD ORGANIZATIONS
- COORDINATE WITH INDUSTRY AND ACADEMIA
- WORK WITH CONGRESS

I would like to end with a chart on future plans.

We are, as I pointed out, organizing to develop a Technology Strategy and Action Plan. The timing for this, by the way, is roughly as follows. It is always dangerous to make predictions about planning, but here it is. I hope to have something that, in the software world, one would call "release 0.5," sometime this spring. Something that may not be very good, and you do not dare hint at to the customer. But that is something you can build on and can use for your own purposes.

The Defense Science Board is planning to spend a large portion of its summer study on very focused topics on parts of this strategy. So I hope to come up with a release this fall or early winter, perhaps sooner. This is very broadly speaking, and I hope you will not hold me to that too tightly, but that is what I would like to happen, and we are working very hard to make it happen.

In this, of course, we will include the investment strategy that Dr. Millburn is working on, and the critical technologies plan, in a consistent fashion. These will all be pieces of a puzzle if it comes out right. And we plan to ensure that it does.

We are thinking about the issue of lead organizations. There are pluses and minuses, of course. Surely we will proceed to give the military departments guidance about the priorities of different kinds of activities from my office. And this guidance will go to the departments and will be part of the construction of the fiscal year 1992 budget.

I believe that this "release 0.5" that I mentioned, we hope to have this spring, will be useful internally in the department in the analysis of the major POM issues. That is what it will be designed to do, to help with resolving some of the major arguments we will have within the department about executing the 1991 budget, the

one where we will live with what the Congress will authorize and appropriate.

I really would like to test this fall and this winter the issue of lead organization, to see how good the response is to guidance. And if the response is not quite what one would like, then we will be able to become more emphatic by assigning leads to particular organizations. I like doing that if it can be done without a lot of ruckus. Management judgment will have to play a key role in how we work that. We plan to work with industry and the university world, of course, and we plan to work with the Congress.

Before I close, I would like to make a couple of comments about the numbers. One of the questions that was raised was a very powerful and useful one to have on the table. It was, "How much money is going into all of these critical technologies? And who is doing what?"

We gave a table that addresses this, and I do not plan to get into the details of the table. We can in the questions and answers if you like. But I want to point out that for the total DOD RDT&E package that is related to science and technology, we have, this year, about 35 percent of the effort relate to the critical technologies. That is up from about 20 percent last year.

That is a very dramatic improvement largely due to people who did this work before I came on board, before my watch. I cannot take and do not wish to take any credit for that. But it is a remarkable improvement in focusing the effort.

One would not want much more, because if you did, as I pointed out at a different hearing, if you had 80 percent of the money going into just 20 technologies, you would undoubtedly shortchange some things you ought to be doing.

In the SDIO, about $1 billion of the total $4 billion is going into the critical technologies. That is 25 percent. Not a bad number at all, but their focus is really on a narrower problem. They do not do some things that other people do in the DOD because of their special mission, and so I am not particularly concerned about the disparity in numbers.

Thirty-five percent is a very healthy participation in these programs department-wide. With these final comments, I will turn the floor over to my colleague from the DOE.

Senator BINGAMAN. Mr. Hahn, we are glad to have you here representing the Department of Energy. Go ahead with any comments you have.

## STATEMENT OF RICHARD HAHN, DIRECTOR OF WEAPONS RESEARCH, DEPARTMENT OF ENERGY

Mr. HAHN. Thank you very much, Mr. Chairman, Senator Wallop.

I am Richard Hahn, and I am the Director of the Office of Weapons Research, Development, and Testing in the Department of Energy, and essentially, all defense-related RD&T in the Department of Energy lies within my office.

I should express regrets for Under Secretary Tuck and Deputy assistant Secretary Mike Barr who cannot be here today. They are

with Secretary Watkins at another hearing involving Rocky Flats, the issue that is taking up a great deal of the Department's time.

With your indulgence, I would like to read a short prepared statement.

Senator BINGAMAN. That is fine.

Mr. HAHN. I would like to begin by saying that a strong national technology base—and I will define that term for you later—will continue to be a fundamental entity to supplying our national security needs in the future.

We feel we must expand our technology exchange and our technology transfer efforts to strengthen the domestic industrial base which supports our weapons program. Only in this way will we be able to assure in the future, reliable domestic suppliers.

Mr. Chairman, we very much welcome the subcommittee's guidance and encouragement in providing the Department's Office of Defense Programs with legislative authority to move aggressively forward in an area so important to our national security.

The National Technology Transfer Act of 1989 gives us new flexibility to work effectively with U.S. industry in many of these critical defense technology areas. And I want you to know that my office is very familiar with the work that Brian Siebert and Linda Stuntz in the Department of Energy are doing in that area.

In this regard, Defense Programs is currently working with the specialty metals industry and with the domestic manufacturing sector to conduct collaborative research and development with the national laboratories in areas where there is a critical national security, as well as a commercial benefit.

Defense Programs will continue to aggressively seek out other "win-win" opportunities, where we can contribute to the national security by enhancing the competitiveness of U.S. industry.

Past significant examples of technology transfer, and they will continue, are computer microchip manufacturing, advances in rapid computer processing, advances in research diagnostic instrumentation, and laser technologies, to name a few areas.

We see a continuing strong requirement for maintaining vigorous defense research and development activities to support these vital programs, both for defense and collaborative R&D of technology for civilian applications.

The superiority of our Nation's defense depends on the quality and quantity of its technology base. Technology base is a term we often use to designate the cumulative sum of all the skills and knowledge which translate eventually into products, and the capability to respond to national needs.

And we strongly support Dr. Ikle's statement on that subject.

The DOE technology base supports both nonnuclear advanced concept research, development, and testing, as well as the nuclear deterrent. The DOE weapons laboratories provide support to DOD in almost all the critical technologies listed in the plan under reimbursable agreement, or because they are synergistic to nuclear weapons performance.

We think it is essential to understand the importance of the Department's weapons laboratories and their contributions to these technologies. And they are certainly the result of more than 40 years of contributions to our national security.

Science and engineering skills resident in these laboratories are not available anywhere in the country, and I think you will find that the report by the Office of Technology Assessment last year, called "Holding the Edge," will support that statement.

We not only want to solve issues currently facing the Department, but we also want to apply these national assets that we call our national laboratories, to other broad national issues as well. It is vitally important to the Nation to maintain the capabilities and technology base of these laboratories to assure that these assets are effectively applied.

In addition to the examples I have already mentioned, there are many other opportunities where these laboratories can contribute even more. This could span contributing to solving problems related to environmental protection, public health and safety, waste management, and I mean nuclear and toxic waste management and minimization, technology transfer, science and education, to name a few examples.

Technology base means people and the Department is committed to assure that the technology base we have does not erode further. A continuing depletion of human intellectual capital would undoubtedly put us ultimately at a competitive disadvantage with respect to both our allies and our adversaries.

We have worked very closely with the Department of Defense in the preparation of this critical technologies plan. My staff has participated in the steering committee, structured by the Department of Defense, to formulate the scope of this plan, and we have also participated in working groups which collected and integrated the specific information for it.

In addition, all our weapons laboratories, Lawrence Livermore National Laboratory, Los Alamos National Laboratory, and Sandia National Laboratory, contributed significant information.

I believe this plan is of great relevance to the future directions of our Nation's defense technologies. I also believe that this was the intent of the Congress when it enacted this legislation.

With this in mind, I would like to comment on the plan from the perspective of changes which we are currently witnessing throughout the world. From my vantage point as manager of a large part of our Nation's defense technology strength, I want to express a position that, while focusing on world changes, we should emphasize the importance of maintaining the strength of our national defense technology base.

Regardless of the direction of international realignments, we still must guard against technological surprise, continue potential threat assessments, enhance our weapons safety and security, especially our nuclear weapons, develop treaty verification means, improve our weapons performance predictive capability to comply with other laws that have been passed recently, and, where feasible, transfer all useful technologies to the private sector.

All this requires DOE to maintain an active and aggressive technology base program which concentrates on both weapon systems and related critical technologies.

It is against this background that we embarked upon the preparation of the critical technology plan. The plan is an essential instrument to advise Congress on which defense technologies repre-

sent a significant part of our national research and development resources, and how they should be focused, so as to provide the highest long-term defense leverage.

The legislative request for this plan requires that DOD, in consultation with DOE, identify not more than 20 technologies which are critical to maintaining our long-term defense superiority.

As in the previous plan submitted a year ago, nuclear technologies were not included. Nuclear effects have been included, but only in the context of their relevance to the needs for development of specific technologies included in the plan.

We have agreed with our colleagues from the Department of Defense regarding these omissions, with the understanding that nuclear technologies are equally critical and that they would be discussed separately.

With the broadening of this year's legislation and recognizing the overall national importance of the plan, DOE considers that a nuclear technologies annex is needed to supplement the DOD plan, and we have initiated planning activities to produce such an annex, which will be prepared by DOE and its national laboratories.

The annex will include all the basic elements necessary to support the Nation's nuclear deterrent, as well as fission and fusion research and development for the long term economic and defense security of the United States.

We believe these technologies, which we plan to include in the annex, are critical to maintaining our long-term defense capability. My office is taking the lead in this effort, and we would plan to submit this annex, with the DOD plan, in March 1991.

Once again, we think it is vitally important that the Nation recognize the value of our national laboratories and the contributions which they can make both to national security and to our national and international competitiveness.

This concludes my testimony. I would be happy to answer questions, as well.

[The prepared statement of Mr. Hahn follows:]

DEPARTMENT OF ENERGY

STATEMENT OF THE DOD CRITICAL TECHNOLOGIES PLAN

BY

RICHARD D. HAHN

DIRECTOR, WEAPONS RESEARCH, DEVELOPMENT AND TESTING

I AM RICHARD HAHN, DIRECTOR OF THE OFFICE OF WEAPONS RESEARCH, DEVELOPMENT, AND TESTING AT THE DEPARTMENT OF ENERGY. MY OFFICE IS RESPONSIBLE FOR ESSENTIALLY ALL DEFENSE-RELATED RESEARCH, DEVELOPMENT AND TESTING ACTIVITIES IN THE DEPARTMENT OF ENERGY.

I AM PLEASED TO HAVE THIS OPPORTUNITY TO TESTIFY BEFORE THIS SUBCOMMITTEE REGARDING THE DEFENSE CRITICAL TECHNOLOGIES PLAN. THE LEGISLATION REGARDING THIS PLAN REQUESTS THAT THE SECRETARY OF DEFENSE PREPARE THE PLAN IN CONSULTATION WITH THE SECRETARY OF ENERGY. MY OFFICE WAS GIVEN THE RESPONSIBILITY TO PROVIDE THAT CONSULTATIVE ASSISTANCE.

A STRONG NATIONAL TECHNOLOGY BASE WILL CONTINUE TO BE FUNDAMENTAL TO SUPPLYING OUR NATIONAL SECURITY NEEDS IN THE FUTURE. WE MUST EXPAND OUR EFFORTS TO STRENGTHEN THE DOMESTIC INDUSTRIAL BASE WHICH SUPPORTS THE WEAPONS PROGRAM. ONLY IN THIS WAY WILL WE BE ABLE TO ASSURE RELIABLE DOMESTIC SUPPLIERS. WE

VERY MUCH WELCOME THE SUBCOMMITTEE'S GUIDANCE AND ENCOURAGEMENT IN PROVIDING DEFENSE PROGRAMS WITH THE LEGISLATIVE AUTHORITY TO MOVE AGGRESSIVELY FORWARD IN AN AREA SO IMPORTANT TO OUR NATIONAL SECURITY. THE NATIONAL TECHNOLOGY TRANSFER ACT OF 1989 (P.L. 101-189) GIVES US NEW FLEXIBILITY TO WORK EFFECTIVELY WITH U.S. INDUSTRY IN CRITICAL DEFENSE TECHNOLOGY AREAS.

IN THIS REGARD, DEFENSE PROGRAMS IS CURRENTLY WORKING WITH THE SPECIALTY METALS INDUSTRY AND THE DOMESTIC MANUFACTURING SECTOR TO CONDUCT COLLABORATIVE RESEARCH AND DEVELOPMENT WITH THE NATIONAL LABORATORIES IN AREAS WHERE THERE IS A CRITICAL NATIONAL SECURITY, AS WELL AS, A COMMERCIAL BENEFIT. DEFENSE PROGRAMS WILL CONTINUE TO AGGRESSIVELY SEEK OUT OTHER 'WIN-WIN' OPPORTUNITIES WHERE WE CAN CONTRIBUTE TO THE NATIONAL SECURITY BY ENHANCING THE COMPETITIVENESS OF U.S. INDUSTRY.

SIGNIFICANT EXAMPLES OF TECHNOLOGY TRANSFER INCLUDE: COMPUTER MICROCHIP MANUFACTURING; ADVANCES IN RAPID COMPUTER PROCESSING; ADVANCES IN RESEARCH DIAGNOSTIC INSTRUMENTATION; AND LASER TECHNOLOGY TO NAME A FEW. I SEE A CONTINUING STRONG REQUIREMENT FOR MAINTAINING VIGOROUS DEFENSE RESEARCH AND DEVELOPMENT ACTIVITIES TO SUPPORT THESE VITAL PROGRAMS, BOTH FOR DEFENSE AND COLLABORATIVE RESEARCH AND DEVELOPMENT OF TECHNOLOGY FOR CIVILIAN APPLICATIONS.

THE SUPERIORITY OF OUR NATION'S DEFENSE DEPENDS ON THE QUALITY AND QUANTITY OF

ITS TECHNOLOGY BASE. TECHNOLOGY BASE IS A TERM WE OFTEN USE TO DESIGNATE THE CUMULATIVE SUM OF ALL THE SKILLS AND KNOWLEDGE WHICH TRANSLATE EVENTUALLY INTO PRODUCTS AND THE CAPABILITY TO RESPOND TO NATIONAL NEEDS.

THE DOE TECHNOLOGY BASE SUPPORTS BOTH NON-NUCLEAR ADVANCED CONCEPT RESEARCH DEVELOPMENT AND TESTING AS WELL AS THE NUCLEAR DETERRENT. THE DOE WEAPONS LABORATORIES PROVIDE SUPPORT TO DOD IN ALMOST ALL THE TECHNOLOGIES LISTED IN THE PLAN UNDER REIMBURSABLE AGREEMENTS OR BECAUSE THEY ARE SYNERGISTIC TO NUCLEAR WEAPONS PERFORMANCE.

I THINK IT IS ESSENTIAL TO UNDERSTAND THE IMPORTANCE OF THE DEPARTMENT'S WEAPONS LABORATORIES WHICH ARE THE RESULT OF MORE THAN 40 YEARS OF CONTRIBUTIONS TO OUR NATIONAL SECURITY. THE SCIENCE AND ENGINEERING SKILLS RESIDENT IN THESE LABORATORIES ARE NOT AVAILABLE ANYWHERE IN OUR COUNTRY, AND WE WANT NOT ONLY TO SOLVE ISSUES CURRENTLY FACING THE DEPARTMENT BUT WE SHOULD APPLY THESE NATIONAL ASSETS TO OTHER BROAD NATIONAL ISSUES AS WELL. IT IS VITALLY IMPORTANT TO THE NATION TO MAINTAIN THE CAPABILITIES AND TECHNOLOGY BASE OF THESE LABORATORIES TO ASSURE THESE NATIONAL ASSETS ARE EFFECTIVELY APPLIED. IN ADDITION TO THE EXAMPLES I HAVE ALREADY MENTIONED, THERE ARE MANY OTHER OPPORTUNITIES TO CONTRIBUTE EVEN MORE. THIS COULD SPAN CONTRIBUTING TO SOLVING PROBLEMS RELATED TO ENVIRONMENTAL PROTECTION, PUBLIC HEALTH AND SAFETY, WASTE MANAGEMENT AND MINIMIZATION, TECHNOLOGY TRANSFER, SCIENCE AND

EDUCATION, TO NAME A FEW. TECHNOLOGY BASE MEANS PEOPLE AND THE DEPARTMENT IS COMMITTED TO ASSURE THAT TECHNOLOGY BASE DOES NOT ERODE FURTHER. A CONTINUING DEPLETION OF HUMAN INTELLECTUAL CAPITAL WOULD UNDOUBTEDLY PUT US ULTIMATELY AT A COMPETITIVE DISADVANTAGE WITH RESPECT TO BOTH OUR ALLIES AND OUR ADVERSARIES.

WE HAVE WORKED VERY CLOSELY WITH THE DEPARTMENT OF DEFENSE IN THE PREPARATION OF THIS PLAN. MY STAFF HAS PARTICIPATED IN THE STEERING COMMITTEE STRUCTURED BY THE DEPARTMENT OF DEFENSE TO FORMULATE THE SCOPE OF THIS PLAN, AND WE ALSO PARTICIPATED IN THE WORKING GROUPS WHICH COLLECTED AND INTEGRATED THE SPECIFIC INFORMATION FOR THE PLAN. IN ADDITION, ALL OUR WEAPONS LABORATORIES, LAWRENCE LIVERMORE NATIONAL LABORATORY, LOS ALAMOS NATIONAL LABORATORY AND SANDIA NATIONAL LABORATORIES CONTRIBUTED SIGNIFICANT INFORMATION. I BELIEVE THIS PLAN IS OF GREAT RELEVANCE TO THE FUTURE DIRECTIONS OF OUR NATION'S DEFENSE TECHNOLOGIES. I ALSO BELIEVE THAT THIS WAS THE INTENT OF THE CONGRESS WHEN IT ENACTED THIS LEGISLATION. WITH THIS IN MIND I WOULD LIKE TO COMMENT ON THE PLAN FROM THE PERSPECTIVE OF THE CHANGES WE ARE CURRENTLY WITNESSING THROUGHOUT THE WORLD. FROM MY VANTAGE POINT AS MANAGER OF A LARGE PART OF OUR NATION'S DEFENSE TECHNOLOGY STRENGTH, I WANT TO EXPRESS A POSITION THAT, WHILE FOCUSING ON WORLD CHANGES, WE SHOULD EMPHASIZE THE IMPORTANCE OF MAINTAINING THE STRENGTH OF OUR NATIONAL DEFENSE TECHNOLOGY BASE. REGARDLESS OF THE

DIRECTION OF INTERNATIONAL REALIGNMENTS, WE STILL MUST BE ABLE TO GUARD AGAINST TECHNOLOGICAL SURPRISE, CONTINUE POTENTIAL THREAT ASSESSMENTS, ENHANCE OUR WEAPONS SAFETY AND SECURITY, DEVELOP TREATY VERIFICATION MEANS, IMPROVE OUR WEAPONS PERFORMANCE PREDICTIVE CAPABILITY AND, WHERE FEASIBLE, TRANSFER USEFUL TECHNOLOGIES TO THE PRIVATE SECTOR. ALL THIS REQUIRES DOE TO MAINTAIN AN ACTIVE AND AGGRESSIVE TECHNOLOGY BASE PROGRAM WHICH CONCENTRATES ON WEAPONS SYSTEM AND RELATED CRITICAL TECHNOLOGIES.

IT IS AGAINST THIS BACKGROUND THAT WE EMBARKED UPON THE PREPARATION OF THE CRITICAL TECHNOLOGY PLAN. THE PLAN IS AN ESSENTIAL INSTRUMENT TO ADVISE CONGRESS ON WHICH DEFENSE TECHNOLOGIES REPRESENT A SIGNIFICANT PART OF OUR NATIONAL RESEARCH AND DEVELOPMENT RESOURCES AND HOW THEY SHOULD BE FOCUSED SO AS TO PROVIDE THE HIGHEST LONG TERM DEFENSE LEVERAGE. THE LEGISLATIVE REQUEST FOR THIS PLAN REQUIRES THAT DOD, IN CONSULTATION WITH DOE, IDENTIFY NOT MORE THAN TWENTY TECHNOLOGIES WHICH ARE CRITICAL TO MAINTAINING OUR DEFENSE SUPERIORITY. AS IN THE PREVIOUS PLAN, SUBMITTED IN MARCH 1989, NUCLEAR TECHNOLOGIES WERE NOT INCLUDED. NUCLEAR EFFECTS HAVE BEEN INCLUDED, BUT ONLY IN THE CONTEXT OF THEIR RELEVANCE TO THE NEEDS FOR DEVELOPMENT OF SPECIFIC TECHNOLOGIES INCLUDED IN THE PLAN. WE HAVE AGREED WITH OUR COLLEAGUES FROM THE DEPARTMENT OF DEFENSE REGARDING THESE OMISSIONS, WITH THE UNDERSTANDING THAT NUCLEAR TECHNOLOGIES ARE EQUALLY CRITICAL AND THAT THEY WOULD BE DISCUSSED SEPARATELY. WITH THE BROADENING OF THIS YEAR'S LEGISLATION AND

RECOGNIZING THE OVERALL NATIONAL IMPORTANCE OF THE PLAN, DOE CONSIDERS THAT A NUCLEAR TECHNOLOGIES ANNEX IS NEEDED TO SUPPLEMENT THE DOD PLAN AND WE HAVE INITIATED PLANNING ACTIVITIES TO PRODUCE SUCH AN ANNEX WHICH WILL BE PREPARED BY DOE AND ITS NATIONAL LABORATORIES. THE ANNEX WILL INCLUDE ALL THE BASIC ELEMENTS NECESSARY TO SUPPORT THE NATION'S NUCLEAR DETERRENT, AS WELL AS FISSION AND FUSION RESEARCH AND DEVELOPMENT FOR THE LONG TERM SECURITY OF THE UNITED STATES. WE BELIEVE THESE TECHNOLOGIES WHICH WE PLAN TO INCLUDE IN THE ANNEX ARE CRITICAL TO MAINTAINING OUR LONG TERM DEFENSE CAPABILITY. MY OFFICE IS TAKING THE LEAD IN THIS EFFORT, AND WE WOULD PLAN TO SUBMIT THIS ANNEX WITH THE DOD PLAN IN MARCH, 1991. ONCE AGAIN, WE THINK IT IS VITALLY IMPORTANT THAT THE NATION RECOGNIZE THE VALUE OF OUR NATIONAL LABORATORIES AND THE CONTRIBUTIONS WHICH THEY CAN MAKE BOTH TO NATIONAL SECURITY AND TO OUR NATIONAL AND INTERNATIONAL COMPETITIVENESS. THIS CONCLUDES MY TESTIMONY. I WOULD BE PLEASED TO ANSWER ANY QUESTIONS.

Senator BINGAMAN. Thank you very much. We appreciate that. We appreciate the testimony from all three of you.

First, let me say that I think this is a substantial advancement from where we were last year. I think the plan is the best effort I have seen in any of our Government agencies to rationalize what we are doing in the area of technology development. And I appreciate all the hard work that I know has gone into it.

I would like to ask Dr. Herzfeld and maybe any of the rest of you who would want to comment about—and this may be something that you alluded to in your initial comments—the spreadsheets you gave us setting out where the funding is.

I guess my concern is that it does not seem to me, from what I can tell, that there is really any very accurate way to break out what funds are devoted to particular areas of technology development in the way that this report tries to do. We identified 20 areas of technology development that we consider most crucial or critical, but we do not budget our funds in a way that let us know whether those are getting adequate attention.

Is that a reasonable concern? Is that something we are going to be able to fix?

Dr. HERZFELD. Your question has a number of components which I would like to address one by one.

First of all, the answer is yes, it is a significant concern, and we want to do better with it. The most fundamental point is the difficulty of making sharp-edged definitions of these technologies. It is hard to do, and not necessary to work very hard to be perfect at that.

One ought to have a rough consensus about what is included and what is not in each one. But I think one can spend a lot of time arguing rather fruitlessly about precisely where the boundaries are. I do not think that is terribly helpful to anyone.

As a consequence, it is not easy to be sure what the detailed budget numbers really mean. Because, until you go down to the individual working scientist or engineer, and look at what he does, you really do not know. That is not peculiar to the Defense Department. It is true in industry and universities.

I mean that people work on what they work on and most of the time it has something to do with what they say they work on, but not all of the time. I am not trying to convey chaos. I am saying there is an intrinsic difficulty here of drawing the boundaries very sharply.

Doing it roughly the way the group did—there is kind of a collegial we—is done as well as one can do this for now.

The improvements will be seen, Mr. Chairman, that next year, when we go into preparing the 1992 budget. We will be able to give guidance and direction on priorities, and we can take that down to as much detail as we think is appropriate.

If there are very particular areas that we feel are under-funded, or areas in which importance has just become obvious, we will be able to make sure that those areas are adequately budgeted.

In the past, not enough attention has been paid to it, and that is, of course, exactly why you introduced the legislation you did, and why your committee is concerned with it.

The production of these two reports, now, has taught people in the Department that one can indeed target these rather substantial funds a lot more thoughtfully than was done in the past. That is what we plan to do.

Senator BINGAMAN. I guess what I really want to know is, should we legislate or request in some way or another that the administration give us a budget in January that allows us to make these determinations as to how much is going to each of these areas?

Let me give you an example: composite materials. I notice in the chart you have here about major linkages between critical technologies, major long-term goals for the S&T program, you list three of the 20 which relate to all of our goals. The semiconductor materials, microelectronic circuits, software producibility and composite materials are the three that are singled out as being related to all of our goals.

In the break-out you have provided, the Department of Energy shows no funding going to composite materials. Now, I am sure that is wrong, but there is no way for us to know whether we are doing what we ought to be doing in composite materials when we cannot get that information out of the budget document. I am just wondering if we should direct that the budget document that the administration sends to Congress give us that kind of information.

Dr. HERZFELD. I hesitate to ask for more direction from the Congress, Mr. Chairman. I guess that is obvious. But you have already been enormously beneficial in helping us rationalize this aspect of the program.

What I would prefer to do is give the guidance and ensure that the budget that comes from the President to the Congress next January is explicit about this.

The proper level of detail for this kind of thing, I think is really something the Secretary of Defense should decide, but obviously we will be prepared to respond in the budget hearings to any inquiries that the committee may have.

I am just not sure how much it is worth for either of us to build that into the basic budget as another feature that the budget document has to carry. It is already pretty complex, but certainly we—and I, specifically—should be able to defend that aspect of the budget before your committee. I plan to be able to do that.

Senator BINGAMAN. My time has expired. Senator Wallop.

Senator WALLOP. Thank you, Mr. Chairman, and let me also thank the panel. Dr. Herzfeld, I recently sent a letter to the Secretary of Commerce regarding the export classification of precision electrical discharge machines for cutting hard materials like ceramic and titanium.

I will submit a question for the record on this subject, but the point I wanted to make today is that I share Senator Bingaman's interest in developing a sound, long-term strategy for technology development, but even if we succeed in this, we unnecessarily add to the cost of our R&D by allowing the fruits of our advanced research to fall into the hands of major potential adversaries. The question that I will submit will deal with that. I think it requires a more considered response than just a reaction here.

Dr. HERZFELD. I would be happy to respond for the record.

[The question referred to follows:]

ELECTRICAL DISCHARGE MACHINES (EDM)

Senator WALLOP. According to recent press reports, the Swiss firm AGIE, has been exporting advanced wire cut electrical discharge machines (EDMs) to the Soviet union since at least 1984. In your opinion, for what purpose will the Soviet Government use these machines? For what purpose does our own Defense Department use these machines?

Dr. HERZFELD. Electrical Discharge Machine (EDM) have been used primarily for metal machining of plastic injection-molding molds and for press molds. They have also been employed for machining of various machine component parts and the manufacture of one-of-a-kind prototype components. The Soviets can conceivably use EDMs for a wide variety of applications both commercial and defense related.

U.S. Department of Defense applications have been primarily for drilling cooling air holes in jet engine turbine blades. EDM technology is now being replaced by more advanced process methods due to inherent limitations of EDM. Other defense related applications include: electronic components, radar waveguides, fuel injection nozzles, and rocket fuel combuster components.

Senator WALLOP. I would like you, Dr. Herzfeld, to comment on the idea put forward by Mr. Gold and Mr. Wagner that R&D for new military systems casts a long shadow, shaping the views of the future in the way that nuclear weapons did in the 1950s.

In particular, I would like to ask you if you believe that a new DOD milestone structure could accommodate development of new systems which are never put into production?

Dr. HERZFELD. Both of the authors sent me a copy of their paper a few weeks ago which I read with great interest. The idea is a very interesting one, but I think I disagree on some of the detail that addresses your question.

Let me first step back and talk about the general notion. It is a very important notion. Indeed, everything we do in national security matters casts a long shadow, and there are lots of people in the world watching what we are doing, what we are saying we are planning to do, and they think about that a lot.

I mean, we are on the stage with a large, very diversified audience, as you know. I remember vividly when I was in the Pentagon in the 1960s and the Minuteman was just being deployed. I was seeing weekly reports of how many were turned over to the Air Force in the silo and how many went operational, and so on.

The numbers were pretty small in those days, but everyone was thinking already about 1,000 Minutemen. That cast a long shadow, it really did, and I do not think the full buy was fully operational until well into the middle 1960s. I think something similar is going on with the SDI program.

One of the great virtues, the great payoffs that SDI has had is, it has cast a very large shadow. It has changed the thinking of a lot of people, certainly across the globe but also in this country, in terms of the significance of a balanced strategic offense and defense posture, that that is really better than the mutual assured destruction posture in all kinds of tangible and intangible ways.

So I see here a system that is not particularly near deployment yet, that is already casting a very strong shadow, and a long one, on people's thinking about strategic matters, and I am very glad it does. It is to our country's advantage that it does, and, in fact, it had a lot to do with some of the events,that happened in the last 6 months.

When you come to other new things, various things are casting a long shadow. The fact that we are building aircraft that are not very easy to spot is public knowledge, and I will not address any detail of that, of course, but the fact that this is being done casts a very long shadow indeed.

There are shadows pointing the other way. The fact that countries that are remarkably less restrained than others find it easy to acquire advanced technology such as antiship missiles, or chemical weapons or such, casts shadows toward us. We need to think about that, and we are, and of course the plan that we are discussing is trying to address those as well.

Now, to your real question, should we design a new approach for the shadow-casters? My answer is a categorical no, no we should not, and here is why. It is a little like playing poker, and you tell beforehand that you are going to bluff. That is not a very effective way to play poker. If it is clearly discernible from the beginning that we are really not serious about what we are doing, the shadow will be shorter and not nearly as dark as it is if people really do not know.

Now, I am not in favor of building weapon systems as bargaining chips. That is not the way to do it. We should build weapon systems because we need them, or we think we need them, and when-

ever we need one we should try and build one when we can afford it and if it will do the job.

I do not think we should build systems for shadow-casting, either. We should do things that cast shadows, but that is being serious. Pure "shadow" is like a deterrence that does not work. When deterrence fails, it is not much of a deterrence. It must be a real deterrent to be a deterrent, one that will work if it is challenged, and similarly we need to build capability that could work, could really work if we found it in the national interest to go ahead. Labeling something with a yellow caution light going into some milestone in the process, I think would just be an unfortunate way to signal lack of commitment.

When you decide not to deploy and we do not go to deployment or we do not go to full-scale development, that may be the right decision. We may decide we do not need what we are about to do, or we cannot afford it, or a combination of both, but let the decision be made on those grounds and let the program go the way all those programs of that kind are handled. That would be my advice.

Senator WALLOP. My time has expired, but let me just say that I am relieved at that answer. Shadows are cast by an object, depending upon the direction from which the light shines, and if after a certain period of time the sun is always on one side of it, it becomes obvious that the shadow is nothing but a shadow. It soon moves around to the other side and the shadow is cast back upon us, threatening us rather than protecting our future.

Dr. HERZFELD. I think the notion is a good one. I think it can be pushed too far.

Senator WALLOP. Thank you.

Senator BINGAMAN. Dr. Herzfeld, last year when the first version of this report was produced we sent copies to various people for their comments. Bobby Inman was one of the people we solicited comments from, and he wrote back with a very good letter of criticism and comment, and he said this in the letter:

> I particularly stress the identification and assessment of related research underway in the United States. A major need in the United States today is better coordination of our overall science and technology efforts. The potential for cross-fertilization between civilian and defense research is real, but our tendency to compartmentalize our work impedes these linkages.
>
> One role of a critical technologies plan is to communicate to the broader scientific and technical community the areas which defense intends to pursue, permitting joint or parallel activities, or perhaps allowing civilian agencies to focus on other areas of research and defer to DOD in those critical technology areas. In this regard, the plan could be very important to OSTP or a National Security Council with a somewhat expanded mission.

In light of that comment and others like it, in this last year's Defense bill we did request OSTP to do this National Critical Technologies Report which would be done with the help of someone from the Department of Defense and someone from the Department of Energy and someone from NASA and various of the other agencies and then individuals from the private sector.

I would be interested in any comments you have about how you see this folding into that report, which will be out this fall, and whether you think this is a proper way to proceed to get a national critical technologies report done.

Dr. HERZFELD. I am very enthusiastic about the notion, Mr. Chairman. I think Bobby Inman is exactly right on this, as he so often is on so many things. It is, of course, a function of the OSTP and its director, Dr. Bromley, who has several hats, as we know, to bring this about.

I have discussed this with Dr. Bromley. An effort is underway. We will participate with a Defense Department representative on the executive group that is forming to handle this. I think we will do roughly the right thing the first time around, and no doubt the second time around will be better, but we are underway. It is a very fine idea, very important, and very important for the Congress to get this overview.

The Congress and the OSTP on the executive side are really the only organizations that have the full overview. All the rest of us have our own acreage to work, but it is not the whole farm.

Senator BINGAMAN. Let me tell you about one specific concern I have in the spreadsheet that you provided us which lists the various agencies and the level of effort that they are making on different technologies. The concern is that the largest single commitment of funds comes from the SDI office.

My experience in the last few years with just following the process up here in Congress, we have a game that the administration plays with the Congress on the subject of SDI funding, and it is unfortunate but it continues, and that is that the administration request is substantially more than Congress is going to fund, and that has been the case each year, and that will be the case again this year, based on what the administration asked for.

The reason that is a concern—I mean, the reason it is not a harmless game, at least in my view—is that some of the funding that SDI is requesting to pursue these various research in these critical technologies is the first to go when SDI's budget is cut, because SDI has other priorities than the development of these critical technologies.

Accordingly, we wind up in a situation where SDI determines at some stage later this year that Congress is not giving them the money that they need at the President's requested level, and therefore they will cut out their portion of the research that is reflected in this chart. Then the scramble is on between DARPA and DOE and various other people to see if they can still maintain a reasonable level of research in these areas.

How do you suggest we solve that problem? Does Congress have to step in and say, in future budgets, we do not want SDI's budget to reflect funding for these areas of research; instead, we want that funding to be put in someone else's budget? I mean, should we say something like that? What should we do to avoid this problem every year?

Dr. HERZFELD. First of all, I am really quite cognizant of the area you are talking about, and I agree with you that that is a matter that needs to be addressed. I have talked to General Monahan about this just a few days ago, and we will try to preserve as much stability in this account as we can. Clearly, it will be subject to large budget pressures, and that may change some of the good numbers that I was talking about.

Let me remind you that I ran the Defender Program in the early 1960s for 2 years in ARPA, as it was then called, which was the rough analog of the SDIO then. I found it very helpful to have a wide range of activities in terms of stretching from research to development to actual prototyping and field testing under my own control. I tried very hard to keep a balance in spite of similar budget pressures because I believe it is very fruitful if the people are trying to address the same problem to work a large spectrum of activities.

I would prefer if the SDIO would stay in the game, so to say, in a significant way. This is my first experience with the current details of this, as you are aware. If we find that we cannot really rely on that, we need to re-think that, and we will do that. We may want to do some of that with reprogramming during fiscal year 1991 as the details of how we implement 1991 become clear. I may ask for such authority first within the Department, of course, and then come to the appropriate committees in the Congress.

We do need to preserve this increase in the stress of the critical technologies. We are all agreed on that. The details of how we do that I would prefer to have a little bit of flexibility with at the moment until we get some more experience base.

I am aware of the risk or the danger to which you are referring in working the problem. I know I will not succeed 100 percent, but I may be able to limit the problem so that we do not have to do anything extraordinary.

Senator BINGAMAN. Well, I would just alert you to it because I know we are going into another budget cycle up here, and we are going to be getting these late night calls saying let me tell you what they just did over at SDI with the funding that was expected for this particular area of research. We have had a few of those episodes before, and I am afraid we will have more.

Let me ask, Dr. Herzfeld, with regard to the planning that you identified that you are going to engage in and hope to bring to some conclusion this fall or winter, is it reasonable that we would expect to see a more detailed road map with regard to each of these technology areas? Is that the kind of end product that you think we would be able to have as a result of that planning process?

Dr. HERZFELD. Yes, I think that is a key part of it. The way we have been talking in OSD about this is that we need a technology strategy and an action plan. An action plan is a kind of road map, and what I showed you is a kind of a prototype, a notional prototype of such road maps.

I see this technology strategy and plan as an adjunct to the defense policy guidance, and there will no doubt be a classified version of that which we will be happy, of course, to discuss with you in closed session; but I hope there will also be an unclassified version that we would be able to discuss at a meeting like this.

Certainly the conceptual content of this plan has to be a road map that shows how each of the major technologies with the major events through the years feeding into subsystems and systems, military systems, as time goes on or could feed into them as the need arose.

So there will be lots of "dotted arrows" in this, in the sense that we will not be sure. At least the options will be there to make sure that the technologies can be used, and we will, of course, as Dr. Millburn in his effort already had done, start with the user end and the market pull, as it were. What are the military problems going to be like? The guidance is pretty good on that.

Fred Ikle's Strategy Commission was pretty wise about that, I believe. That was better work than anybody knew they were doing, I guess. All that is very helpful, and the guidance we have been getting from the Congress on these matters is helpful, so that we need to address the likely military problems in the next 20 years, the likely military systems that will be useful in solving these problems.

By the way, there is a good deal of consensus about what that list is. There is no great mystery about that, and some of this is published in the technology working group report that the prior two witnesses have mentioned, and in other places.

There is a fair consensus developing for that, but we need to first of all flesh out some of the details. Second, we need to be a little more innovative in some of the things we are thinking about. Unless there are a few things in such a plan that strikes one as bizarre, you have not tried hard enough. That is my feeling about such an effort.

We have not tried to invent enough. These ideas may not come about, but the thinking should be broad enough that you would say, "Oh, my goodness, what are they talking about?" That is how some of the really exciting things get started and get done. So we will have a hand at that.

Another key thing that has to be in that plan is what we do about people. The people issue in the Department of Defense is going to be a real cruncher, as I know you are aware. The drawdown of the standing forces is going to make people problems. It is not my job to talk about that, but I am aware of it. Any shift in the priorities of how the RDT&E package is spent is going to make people problems. People who build airplanes are not necessarily the right people that go into a laboratory to investigate semiconductors, and so there is some planning to be done.

I am very worried about the long-range infrastructure that our universities provide on this 20-year basis. I think we are having a number of real problems. One is that the facilities and the equipment at the universities is becoming outmoded. The number of students in the proper fields is going down, as you know. I am less troubled by many of the students not being citizens, as Hans Mark and I were remarking.

When this issue came up in our Strategy Commission deliberations 2 or 3 years ago, we reminded everyone that when Hans and I were graduate students we were not citizens, either, and we would have been counted on the other side, sort of the "bad" side. The main difference now is that the young people are coming across the Pacific. They used to come across the Atlantic, when Hans and I were young.

The real problem, therefore, is to keep the good people here. Give good incentives for these people to become Americans just as we did. This is all part of this problem. I see this as a seamless web.

I wanted to just highlight some of the notes that we hope we will be addressing.

Senator BINGAMAN. Let me just ask one other issue.

Dr. Herzfeld, did you have any immediate reaction or thought on the suggestion that Mr. Hahn has made or the statement he made that DOE is planning to prepare a nuclear technologies annex which they would use as a supplement to this next year? Is that an appropriate thing, as you see it? Is that a whole different kettle of fish, nuclear technologies, or is that something that could be judged on its merits as part of this list of 20?

Obviously, we do not want a lot of different annexes coming out because that begins to destroy the whole purpose of this exercise if everybody who is pursuing a particular area puts their area of focus in an annex, but do you think that a nuclear technologies annex makes sense?

Dr. HERZFELD. I think it does, and let me explain why. I do not think it dilutes your effort at all. We will wind up with more than 20 critical technologies if we do that, but that is all right, I believe, if it is done sensibly.

Let me remind you that one of my jobs is chairing the Nuclear Weapons Council where I am part of the tradition of civilian control of nuclear weapons in this country. I take this job extremely seriously, and it is involved very deeply with the Department of Energy.

So from the point of view of national security, I welcome a joint effort perhaps done quite similarly though not necessarily identically to the DOD report but in a way that fits reasonably smoothly with the Department of Defense effort. I am not troubled by that at all. I thought it was a fine idea, actually.

Senator BINGAMAN. Let me stop with that. We have a vote on. You all have been very patient and generous with your time. I think this has been a useful hearing, and I think the report is a very useful document for us this year. So I look forward to continuing to work with you and seeing what we can do to support the funding levels for these areas.

Thank you all very much. I appreciate the Department of Energy's involvement in this.

[Prehearing questions submitted to the Department of Defense for the record, and referred to in the Chairman's opening remarks, follow. Additional questions for the record submitted by Senator Wallop also follow.]

DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING
*Washington, DC, March 27, 1990*

Hon. JEFF BINGAMAN,
*Chairman, Subcommittee on Defense Industry and Technology,*
*Committee on Armed Services,*
*U.S. Senate, Washington, DC.*

DEAR MR. CHAIRMAN: This is in reply to your letter of March 22, 1990. As requested, written responses to the questions contained therein, are attached.

Sincerely,

CHARLES M. HERZFELD.

Attachments.

## QUESTION 1

*Question:* (Planning for the future of S&T): Please provide your current schedule for completion of the three stages of the DOD S&T planning process. Are all identified critical technology implementation plans scheduled to be made available at one time, or will they be released as they are finished by the lead organizations?

Answer. The first stage is the DOD S&T Investment strategy. We hope to release it in about 2 to 3 months. The second stage is the Critical Technologies Plan, which you have before you. It is an updated and expanded version of last year's plan to comply with the new law. The third stage, the implementation plans for the critical technologies, is just beginning. We intend to issue these plans during the current calendar year, so that they can be taken into consideration for the next Critical Technologies Plan.

## QUESTION 2

*Question:* (Funding):Of the total S&T funding shown for each of the 20 selected critical technologies, please provide the following information for the time frames used in the Plan. The data should be derived from the information used to develop the order-of-magnitude budgetary estimates included in the Plan.

a. The proportion of funding that is associated with DOD and associated with DOE.

b. Within the DOD portion, the amounts that are associated with the Strategic Defense Initiative program.

c. Within the DOD portion, the amounts that are associated with a military service or defense agency. In those instances where one service or defense agency has, in your judgment, the preponderance of the funding, then other services and agencies can be designated as "minor" or "negligible" or some other equivalent notation.

d. Where a service or defense agency funding constitutes a significant proportion of the total funding for a critical element in the fiscal year 1991 defense budget request, please identify the Program Element(s) under which that funding is intended to be provided.

Answer. a. In fiscal year 1991, approximately $280 million (9 percent) of the funding shown in the plan is provided by DOE, the rest is provided by DOD.

b. The amount associated with SDIO in fiscal year 1991 is approximately $920 million.

c. The amounts associated with the Army, Navy, and Air Force, respectively, are approximately $410, $360, and $420 million, DARPA about $530 million. Relatively minor amounts are associated with 0SD and DNA. The matrix table shows the funding estimates by critical technology and by major sponsor:

| TECHNOLOGY | TOTAL | ARMY | NAVY | AF | SDIO | DARPA | DOE | DNA | OSD | BTI |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. SC & MC | 450 | 34 | 24 | 32 | 50 | 224 | 80 | 7 | | |
| 2. SW | 130 | 6 | 14 | 11 | 21 | 50 | 15 | | 13 | |
| 3. COMPUT | 120 | 4 | 11 | 1 | 22 | 42 | 40 | | | |
| 4. MI/ROB | 120 | 26 | 10 | 12 | 2 | 43 | 4 | | 21 | 2 |
| 5. SIMUL | 210 | 41 | 16 | 35 | 60 | 23 | 8 | 25 | | 2 |
| 6. PHOTON | 100 | 20 | 13 | 22 | 12 | 7 | 25 | 1 | | 1 |
| 7. RADAR | 110 | 20 | 20 | 20 | 40 | 10 | 0 | 2 | | |
| 8. SENSOR | 460 | 25 | 46 | 15 | 355 | 13 | 0 | 2 | | 4 |
| 9. SIG.PR. | 130 | 23 | 21 | 20 | 45 | 10 | | | | 11 |
| 10.SIGNAT | (classified) | | | | | | | | | |
| 11.ENVIRO | 180 | 27 | 43 | 25 | 70 | 15 | | | | |
| 12.DATA F | 50 | 3 | 12 | 7 | 12 | 10 | | | | 6 |
| 13.CFD | 80 | 20 | 13 | 10 | 7 | 3 | 25 | 3 | | |
| 14.PROPUL | 180 | 31 | 23 | 122 | 0 | 4 | | | | |
| 15.PULSE | 160 | 2 | 2 | 0 | 55 | 22 | 65 | 5 | | 10 |
| 16.PROJEC | 120 | 30 | 10 | 5 | 50 | 15 | | | | 10 |
| 17.HEDM | 90 | 16 | 10 | 15 | 30 | 5 | 14 | | | |
| 18.COMPOS | 170 | 30 | 29 | 30 | 55 | 26 | | | | |
| 19.SUPERC | 95 | 2 | 10 | 22 | 30 | 12 | 7 | 12 | | |
| 20.BIOTEC | 100 | 50 | 35 | 15 | 0 | 0 | 0 | | | |
| TOTALS: | 3055 | 410 | 362 | 419 | 916 | 534 | 283 | 57 | 34 | 46 |

d. We shall provide this answer after further analysis.

QUESTION 3

*Question:* (Definition of Technology): In order to assist the subcommittee in understanding the Critical Technologies Plan, a description of how the term "technology" is used in this Plan would be of help. specifically, the items under the Weapon System Environment (WSE) appear to be more science than technology. Likewise, the major work under Computational Fluid Dynamics (CFD) would appear to be mathematical solutions of the Navier-Stokes equation, the NASP program and other items which, while important, would not appear to satisfy common definitions of the term "technology." Your comments on how this term is to be understood in reviewing the Plan would be helpful to the subcommittee.

Answer. We gave a discussion in last year's report based on the definitions in Webster's Third International Dictionary. Webster defines technology (inter alia) as "the science of the application of knowledge to practical purposes," followed by an alternative definition, "the application of scientific knowledge to practical purposes in a particular field." The first definition is tantamount to "knowing how to" (but not actually doing), while the second definition amounts to "doing it."

CFD and WSE are closer to the first definition ("knowing how to"). CFD replaces expensive wind tunnel tests with much more economical and much speedier computational techniques. In ASW the ocean environment is an integral part of the application of sonar arrays.

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## QUESTIONS SUBMITTED BY SENATOR MALCOLM WALLOP

### R&D FIXED-PRICE CONTRACTS

Senator WALLOP. Dr. Herzfeld, at least over the period of the Reagen buildup, DOD has insisted that industry at least partly foot the bill for large R&D programs. This brought us fixed-priced R&D programs which devastated industrial investment funds when systems never went into full production. I think it is pretty well acknowledged that this will have to change. Do you agree that the Government will have to pay in full for R&D on new systems that may never be produced?

Dr. HERZFELD. DOD policy is to place no more cost risk on industry than is equitable. In practice, there were several departures from this policy during the mid 1980s, usually through the use of fixed-priced contracts for large development efforts. The current DOD management has already made clear that such departures from stated policy will no longer be tolerated, most notably through the establishment in 1989 of a requirement that no fixed-priced development contract in excess of $25M be awarded without the prior determination by the USD(A) that cost risk is sufficiently low to permit the use of a fixed-priced contract. I believe that this requirement, along with the normal process of 0SD oversight of major programs, will ensure that industry will not incur the kind of major financial risks on future defense development programs that it is now experiencing on programs placed under contract several years ago.

### CRITICAL TECHNOLOGIES PLAN, FUNDING

Senator WALLOP. Dr. Millburn, if I add all the funding, fiscal year 1991-1996, for all twenty critical technologies, it appears that you are planning for a growth of only about 1.9 percent over that period if the figures are meant to be constant dollars (or a decline of 1 to 2 percent if the figures are then-year dollars.)

Is DOD saying that it is all right to hold critical technology R&D to such small growth rates?

Dr. MILLBURN. The amounts reflect our best judgment in light of a declining budget situation and an uncertain treat. It is my personal view that the amounts are low. However, we plan to consider science and technology funding for fiscal year 1992-97 during our spring review.

### CRITICAL TECHNOLOGIES PLAN, ROCKET PROPULSION

Senator WALLOP. Rocket propulsion, i.e., non-airbreathing, seems conspicuously absent from the list of critical technologies. Since the continued development and exploitation of space will have a major impact on future U.S. military and economic strength, space propulsion technology advances will be critical.

Has DOD aggregated space propulsion technology under airbreathing or 'hybrid', as in the National Aero-Space Plan?

Has "traditional" space propulsion technology reached its development limits, thereby necessitating new or revolutionary approaches?

In sum, what is DOD's approach to the space-propulsion technology issue?

Dr. MILLBURN. The answer to the first question is No. Rocket- propulsion technology efforts are included in one of the critical technologies, high energy density materials. These efforts are aimed at identifying new propellants which would significantly increase rocket-propulsion capabilities.

In answer to the second question, the characteristic of rocket propellants with the largest impact on system capability and economics is specific impulse. Only limited improvements in this characteristic have recently been made. If we are successful in identifying new high-energy-density propellants, as mentioned earlier, then this current limitation will have been overcome. New or revolutionary approaches, such as exemplified by the National Aero-Space Plane program, are always sought.

Concerning the last question, DOD's approach to space-propulsion, we will continue to pursue high-payoff goals within a balanced science and technology program. As pointed out in the Plan, the absence of a technology from the critical technologies list does not mean that it is not important, or that it is not funded. Within the framework of critical technologies, we will continue our efforts on high-energy-density propellants, because of the potentially large payoffs involved.

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[A copy of the DOD Critical Technologies Plan dated March 15, 1990 and referred to during this hearing will be kept on file.]

[Whereupon, at 12:20 p.m. the hearing was adjourned.]

APPENDIX

# TECHNOLOGY FOR NATIONAL SECURITY

Report by the Working Group
on Technology, submitted to the
Commission on Integrated
Long-Term Strategy

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# THE STATE OF KNOWLEDGE IN THE BASIC PHYSICAL SCIENCES

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By understanding the current state of knowledge in the basic sciences we can begin to identify areas which could yield new advanced technologies and identify areas where more effort or funding may be required. This annex looks in some detail at the four basic physical science research areas identified in chapter V, and their relationship to future technology opportunities.

The state of basic knowledge in these scientific disciplines and, more importantly, the projected rate of change of that knowledge help select the technical areas with most leverage. It is not easy to answer these questions and many of the answers will be somewhat speculative. However, such speculations are undoubtedly of value in providing a framework for thinking about the problem and ultimately for making investment decisions.

Quantum mechanics has been a remarkably effective tool for sixty or more years, ever since the great contributions made by Heisenberg, Schroedinger, and many others in the 1920s. For all practical purposes, quantum mechanics is still the best theory for describing the behavior and structure of matter. It is remarkable that this statement is true for the lowest as well as the highest energy phenomena. Nothing has yet invalidated the basic theorems of quantum mechanics; that is, the uncertainty principle and the relationships between particle energy, momentum, wave length and frequency have not been changed.

Everything that has happened in physical science in the last sixty years or more has yielded to understanding using quantum mechanics. This includes things such as lasers, the new high temperature superconductors, the structure of proteins and nucleic acids, and the most exotic things in high energy physics. The introduction of supercomputers has been particularly important. It is now possible to make "ab initio" calculations of chemical structures in complex molecules and predict their properties.

The field of atomic physics has been completely developed by the ability to calculate very detailed properties of atoms. For example, the development of x-ray properties of atoms has led to the development of x-ray lasers driven by nuclear explosions. The likeliest break in this situation probably will come when we try to understand the properties of matter under extreme conditions in objects such as quasars or black holes. At that point, it is at least possible that the basic theorems of quantum mechanics will break down, and will be replaced by some

generalizations of them.

The physics of the electromagnetic field as first developed in the mid-19th century and then modified later by the theory of relativity in the early years of this century, has also been remarkably durable and successful. Once again, things such as lasers, the properties of ionizing radiations and the behavior of electromagnetic waves used in the most sophisticated communication schemes have all been successfully described with the currently available theories. Complex problems in non-linear optics have yielded to a combination of what we know about electromagnetic theory and the structure of matter using quantum mechanics.

Once again, the likeliest place to look for changes in this situation is in cosmology, which studies matter that exist under particularly exotic conditions. There may also be some important surprises when an understanding of the propagation of radiation over great distances is achieved. For instance there are some who suggest that the cosmological red shift is not a Doppler shift but rather a property of radiation itself. Should that be the case, then a breakdown of the conventional wisdom will have occurred, which in this case may or may not have practical consequences.

Transport physics has been a bit of a stepchild for the first three quarters of this century. It has definitely been overshadowed by quantum mechanics, nuclear physics, particle physics and other areas of modern physics. Recently, perhaps in the last decade or so, there has been a resurgence in this field. Transport physics is characterized by the fact that the Boltzmann equation--which is the fundamental law--tends to lead to highly non-linear differential equations in practice (the Navier-Stokes equation is a good example). Non-linear equations of this kind have resisted attempts to solve them in general terms until the recent advent of supercomputers.

It is the existence of these high speed computing machines that has made possible really remarkable progress in transport physics. Perhaps the best example is the discovery of regularities that have turned up in computer solutions of turbulent flows that have led to very real insights into the nature and statistical features of turbulence. This has come to be called Chaos Theory and it is perhaps the most important example of how numerical solutions using high speed computers can lead to new fundamental knowledge.

The same statement can be made for plasma physics, where highly non-linear equations also govern the behavior of these ionized gases. Finally, energy and radiation transport have also benefited in important ways from the availability of very high speed computers.

Mathematical physics is probably the fastest moving of the areas in basic scientific knowledge that we have listed. The advent of high speed supercomputers has been instumental in all recent discoveries in this area.

The technology of computers is still improving. One reason for this projected improvement is that new developments in electronic technology will provide computer architects with faster and smaller components. Perhaps more important are research results in computer architecture and computer design. Advances in this area come from new knowledge in fundamental mathematics, including topology, geometry, advanced statistics and, even more fundamentally, from new insights into the theory of knowledge itself.

It is the development of new computers that probably will have the most important impact on fundamental scientific research in the coming decades. There are new developments on the horizon in computer design involving new organizational principles for computing machines that will change entirely the way we do business in this important area. The United States still has a major advantage in this field. This leadership is being challenged by the Japanese, who have caught up with the United States in the development of computer architecture, design and software.

While the health of basic science in the United States is good, a word should be said about the administration and funding of basic research. Judgments on funding distributions are made today primarily using a "peer review system' in which committees of the National Academy of Sciences, the National Academy of Engineering and of the various funding agencies in the federal government make the fundamental funding decisions. This system generally works well, but suffers from a major problem. Specifically, it is often difficult to get radically new work funded because the peer review committees tend to be dominated by people who have helped to create the currently accepted structure of scientific knowledge. These people are often not friendly to having this structure disturbed. Thus genuinely new ideas tend to be short-changed when funds are distributed by a peer review mechanism.

There are some excellent examples that illustrate this point. Professor Richard Mueller of the University of California (Berkeley), for example, was unable to get funding through the normal channels for an experiment that eventually turned out to be most fundamental in understanding the nature of the background radiation in the universe, the so-called $3^{o}K$ radiation. He had to rely on funding that was arbitrarily granted to him by the director of NASA Research Center. Professor Mueller subsequently won a McArthur Foundation prize for this work and his results are now well accepted. Some research funds must be available outside

the peer review system in order to take care of exceptional cases.

## MAJOR TECHNICAL AREAS WHICH ARE LIKELY TO DOMINATE FUTURE TECHNOLOGIES

A discussion of progress in basic science is interesting but it is not useful for technology assesment until it can be applied to practical ends. There are ten major technical areas that are important for national defense, and that also have clear importance to national economic development. It is useful to list these areas and to show how they are related to the basic scientific disciplines on which the technical areas are based.

The connection between scientific progress and technical progress is a subtle one and the implication that the two are directly connected is not necessarily correct. There are many other factors such as the rate of investment in various technical developments, the availability of people to carry them out, and the general atmosphere that determines what interests people affecting the outcome. Nevertheless, history has shown that the connection is sufficiently clear that it needs to be taken very seriously.

There is no doubt, for example, that the development by Maxwell of the theory of electromagnetism in the 1850s led rather directly to the creation of a strong electrical industry in the ensuing two decades. Likewise, the early basic research in organic chemistry by Emil Fisher and his colleagues in the last two decades of the 19th century initiated the strong German chemical industry in the early years of this century. Closer in time and geography, it is rather clear that the discovery of the transistor at Bell Laboratories by Bardeen, Schockley, and Brattain in 1950, followed by the establishment of twelve national materials research centers by the Advanced Research Projects Agency and the Atomic Energy Commission at good universities in 1960, pushed the creation of the US semiconductor and computer industry, indeed made its growth possible.

## THE KEY TECHNOLOGIES

Once again, as in the case of the scientific disciplines, there is considerable overlap between the major technical areas and the definitions that have been made are, to some extent, arbitrary. However, it is probably not too important to consider the exact scheme that has been used to categorize the various scientific and technical efforts. The important thing is that there is some order around which thinking about the problems can be organized.

Listed below are the ten key technical areas of interest. The basic scientific disciplines on which progress in each of the technical areas depends are noted in parenthesis next to the technical area.

(1) Materials technology. (quantum mechanics, particle physics, computational physics).

(2) Electronics, computer and electrical technology. (Electromagnetic theory, quantum mechanics, computational physics).

(3) Nuclear technology and nucleonics. (Transport physics, quantum mechanics, particle physics, computational physics).

(4) Plasma technology. (Transport physics, electromagnetic theory, computational physics).

(5) Optical technology. (Electromagnetic theory, quantum mechanics, computational physics).

(6) Energy technology. (Transport physics, electromagnetic theory, quantum mechanics, particle physics, computational physics).

(7) Fluid mechanics and aerodynamics. (Transport physics, computational physics).

(8) Biotechnology. (Quantum mechanics, electromagnetic theory, computational physics, transport physics.)

(9) Biomedicine. (Quantum mechanics, transport physics, computational physics.)

(10) Manufacturing technology. (Robotics, design for simplicity and quality, testing and inspection, management for quality). This is somewhat different from the other technologies, but equally important, and relatively neglected in the United States.

What is most important about his list of major technical areas is that all of them depend on progress in computational physics. This is a point that must be stressed in any strategy for technical development. It is very likely that in the next two or three decades progress in any of these technical areas, at the basic level, will depend on continued progress in computational physics, and therefore, on the rapid development of computer technology. Basic research investments in these fields are likely to yield important benefits across the board. This is particularly true of basic work in the mathematical disciplines

related to the organization and architecture of computers. There are many who believe that the development of parallel architecture, hypercubes, connection machines and other new architectural concepts in computer science and technology will lead to enormously important breakthroughs in other areas as well.

IMPORTANT APPLICATIONS

The state of knowledge in the scientific disciplines described above seem to us to be vital for the steady generation of new technology required for national security. It is important to show how these scientific opportunities are likely to evolve into high leverage technologies. When dealing with the question of practical applications, the most important investment decisions, must be made.

(1) **Materials.** The most important development in the last twenty years in this technical area is the creation of "tailored materials" or "engineered materials" for many purposes. This broad area of "synthetics" ranges from new plastics to sintered metal alloys created by new techniques in high current electrical technology. The most promising applications include:

- **High temperature, high strength materials.** Applications include single crystal turbine blades, exotic sintered alloys applied to armor for tanks, materials for the development of gun barrels, the construction of submarines and aircraft and many others. Much progress can be expected in this area and it is clearly important to the national security because it will make possible aircraft, ships, tanks, etc., with much higher performance.

- **Structural composites.** As primary structural materials for aircraft and spacecraft, light weight and high strength are the important considerations. Improved armor for aircraft and for other vehicles can also be expected. The technology is well advanced, but much more progress can be expected. Very important national security related applications are possible.

- **Materials with special electrical and electronic properties.** Composite materials for the construction of stealth vehicles and other low radar cross section applications. High temperature superconductors, a genuine recent surprise that clearly has many important defense applications. Materials with especially high dielectric constants that can be used as energy storage media in capacitors, making more feasible directed

energy weapons of all kinds. Much more progress in this area can be expected, driven by obvious defense requirements.

- **Fire-resistant material and paints.** Polybismailides and other synthetic materials with fire- and heat-resistant properties. They are very important for shipboard and aircraft applications to prevent fires and to contain fire damage. Synthetic foams for use inside fuel tanks to prevent gasoline fires on aircraft can be developed. Much progress in the development of materials of this kind can be expected, and the defense applications are obvious.

- **Solid lubricants.** It is now possible to implant lubricating materials like graphite in the structural elements or the moving parts of an engine. As the moving part of the engine wears, the lubricant is metered out in precisely the right quantity so that no lubricating oil from the outside is necessary. The application of this technology could greatly reduce engine maintenance costs and increase reliability.

- **Active synthetics.** These are materials that change their properties as a function of external conditions. Optical materials, for example, react to light intensity. Medical applications will emerge: capsules that are either swallowed or implanted can be designed to deliver drugs to people in a precisely-metered fashion. Much progress can be expected in this area.

- **Substitute materials.** Shortages of various strategic materials have been thoroughly documented. Many of these shortages can be mitigated or eliminated by the development of substitute materials. Research in this area should be given the highest priority because of vital national security applications.

(2) **Electronics.** Important advances are expected in the area of electronic components. It will be possible to reduce the size of electronic components by about a factor of 100 before the physical limitations imposed by the rules of quantum mechanics for the functioning of semiconducting switches are reached. The argument for this prediction is based on fundamental scientific considerations and is likely to be correct. Some promising applications appear in the following list:

- **Integrated circuits.** More advances in the manufacturing of integrated circuits are on the horizon. Electron beams and x-ray techniques for making mats will make it possible to build smaller

circuits. Smaller integrated circuits are of obvious importance for the development of smaller, more compact and higher performance computers. Developments in this area are, therefore, critical to achieving some of the objectives that have been stated with respect to the application of computational physics. The national defense applications such as super smart munitions are of the highest priority.

- **Sensing devices.** Detectors for low-level photon fluxes at all frequencies. Electro-acoustical devices (important for anti-submarine applications) and very sensitive strain gauges all are in a rapid state of development. Most of these devices depend on the understanding of electromagnetical and electro-optical properties of materials. Applications range from the detection devices on satellites designed to look at rocket launches to sonar devices used in anti-submarine applications.

- **Electromagnetic materials.** There is some overlap in this field with materials that have been previously discussed. Piezoelectrical materials in optics and polarizable materials for energy storage in capacitors are examples, as well as high strength materials for energy storage and rotating machines such as homopolar generators. Both the polarizable materials and the high-strength materials for energy storage devices have important potential applications. In the case of rotating machinery, energy storage on the order of 10 percent of the value of chemical high explosive can be achieved in the next few years. There are obviously important military applications of this technology, including the development of electromagnetic hypervelocity guns. Such guns would lead to the creation of artillery that does not have the limitations of "bullet" velocity imposed by the use of chemical explosives as propellants.

- **Computer design.** This is closely related to electronics and needs to be mentioned, but really covers a whole range of new ideas. Computers will be both faster and smaller in the future, and this technology is a central component in all other matters discussed in this paper.

- **Communications technology.** New microwave devices will be developed which will make high-frequency communications in the twenty to thirty gigahertz region possible. This will be especially important for satellite applications. Laser communication experiments in space have already been conducted and

have proven the feasibility of this technique. Fiber optics is another technology that has just begun to appear in the first important applications. Defense applications continue to be important.

- **Radar technology.** Important improvements can be expected due to better electronic components and computers. Particularly the special applications such as space-based radars for surveillance and targeting and terrain-following radars for aircraft and cruise missiles are most promising for further progress. Imaging radars, because of their ability to penetrate cloud cover and to be used at night, will find increasingly important military applications.

(3) **Nucleonics.** In spite of the fact that there has been a slowdown in some areas of nuclear technology in this country, there are, nevertheless, most interesting developments in nucleonics that are likely to have important military applications. Items of particular interest are:

- **X-ray lasers driven by nuclear explosions** have been developed. This achievement was possible because of new understanding of atomic physics, that is, the physics of highly-ionized atoms made possible by the advent of supercomputers. X-ray lasers could have most important applications in strategic defense and other areas requiring very long-range weapons, but practical applications are more than a decade in the future.

- **Special-purpose nuclear weapons.** Many things are happening in nuclear weapons design, again aided by the development of very-high-speed computers. The results are classified so it is not possible to describe them here. Some applications may be decisive on a tactical military level. The major point is that the design of nuclear weapons and nuclear devices is not a "finished" field; many important improvements are possible.

- **Nuclear reactor design.** The development of efficient gas-cooled reactors in the last ten or fifteen years may be a promising way out of the current dilemma faced by the nuclear power industry. Gas-cooled reactors are inherently safe, and they are more efficient than water-cooled reactors because they operate at higher temperatures. Gas-cooled reactors are a promising choice for the next generation of nuclear power systems. Miliary applications are secondary.

- **Space nuclear power.** The Soviet Union has developed nuclear reactors to power spacecraft. The United States has not done that as yet. For spacecraft or space stations that require powers above 1 megawatt continuous power delivery, nuclear reactors are required. Space nuclear reactors are essential for applications of space based strategic defense systems. The current project to develop space nuclear power reactors (SP-100) should be pushed with all deliberate speed.

- **Isotope applications.** Applications of isotopes continue to grow, especially in applications to radioactive tracer techniques. These have proved critical in developing structural analyses of complex biological molecules such as proteins and deoxyribonucleic acids. This is very important for basic progress but not directly related to military applications.

- **Nuclear fuels.** There is no shortage of nuclear fuels in the world. The United States has adequate resources. Eventually these will be developed intensively in the United States as other power sources decline for environmental or fuel shortage reasons. The nuclear industry must maintain a readiness for rapid expansion. Military applications for nuclear submarine reactors require the maintenance of an adequate nuclear fuel supply.

- **Nuclear waste disposal.** The technology for nuclear waste disposal is in hand. The location of the high level nuclear waste disposal site will be a high priority political decision for the next administration. The military importance of this problem arises from the need to dispose of wastes from nuclear submarine reactors.

(4) **Plasmas.** Plasma physics is one of the most difficult experimental and theoretical areas in modern science. It is also one of the oldest, since modern physics grew out of the early experiments with gas discharges. Finally it's applications are extremely versatile, ranging from arc welding, to experimental work on nuclear fusion, to plasma measurements in the upper atmosphere. The most important applications are listed below:

- **The structure of the upper atmosphere.** A detailed understanding of the chemistry of the upper atmosphere is critical for dealing with situations such as the ozone depletion problem. Understanding the physics of the upper atmosphere, especially the location and

behavior of charged particle layers or plasma ducts, has critical applications to communications and to radar technology. Long-range, Over-The-Horizon (OTH) radars that use reflections from the upper atmosphere have particularly important military applications. Predictive theories of the behavior of the upper atmosphere are needed to use OTH-B (long-range Over-The-Horizon radar) effectively.

- **Fusion energy.** This is the classic focus of high-temperature plasma research. Recently, a decision was made to concentrate on the Tokomak geometry for fusion research. It is not clear whether this is wise. The Tokomak geometry is probably the best, but this is still not a sure bet. The development of fusion energy is surely important for the long run. After thirty years we are still looking for the way to do it, and this has been discouraging. The other side of the coin is that we have not found any particular reason why fusion energy cannot be extracted from the DT and the DD reaction in a controlled way. There is no scientific law that says it cannot be done. Fusion research should be continued at a good level of support to hedge against long-term energy problems.

- **Space propulsion.** The requirements for low thrust high specific impulse propulsion are important for a number of space applications. Plasma jet propulsion is a good candidate. The long-term future requirements are for strategic defense, a return to the moon for the establishment of a permanent base, and eventual trips to Mars. Flight experiments on a small scale should be performed.

- **Magnetohydrodynamic energy conversion.** This technology could be important for space applications related to strategic defense and other large scale power operations. Ground-based research is required before any commitments to space-based systems can be made.

- **Welding techniques.** High-pressure plasma arcs are used as the environment in which the welding of large blocks of metal can be accomplished. This has obvious applications to the welding of large-diameter pipes, armor plate metal processing, and other manufacturing technologies. Some basic knowledge of plasma behavior has been important in the development of this technology, and work in this area should be continued for possible applications in manufacturing military systems.

(5) **Optics.** The science of optics has seen great strides in the past two decades. The advent of lasers in 1962 probably was responsible for the resurgence of optics. Physical optics, the interaction of materials and electromagnetic radiation, has seen a particularly important renaissance. Within this area, the non-linear interaction between radiation and matter has led to both interesting and important applications as listed below:

- **Gas dynamics and chemical lasers.** These lasers depend on high energy gas flows and chemical interactions to produce power. Lasers with power outputs of 1-10 megawatts have been built using these principles. Gas dynamic and chemical lasers are the most promising for near-term military applications.

- **Free-electron lasers.** These are very promising devices for the creation of high-energy laser beams. Several have been made to work at relatively high power levels but still at relatively low frequencies (microwaves). The principle of the free electron laser is different from other lasers, since the energy of the laser beam is extracted from a high-energy free electron beam rather than from quantum levels of atoms in materials or gas flows. The principal advantage of the free electron laser is that it can be operated at any desirable wave length and has the potential for very high energy output. The military potential is for ground based anti-satellite weapons, as well as strategic defense applications.

- **Glass lasers.** Progress in high-energy glass lasers has been substantial. Great technical difficulties with the interaction between radiation and the glass in the nonlinear region have been overcome. The applications of these lasers are still in question, and materials technology is clearly important in this area.

- **Laser propulsion.** This is a long-term possibility that has been suggested, and a few preliminary experiments have been performed. The potential is interesting because it may become a low cost way of lifting large amounts of material to earth orbit. It is not clear whether it will work, and therefore should be kept at the experimental level for the present.

- **Fiber optics.** Fiber optics have become very important in the communications applications. This is in part due to advances in material technology that permit the tailoring of glass or plastic fibers so that they have good light transmission properties. The use of light for information transmission makes broad-band (high

data rate) communications possible. Furthermore, fiber optic communication systems are nearly invulnerable to electromagnetic interference. This last point is important for military applications because it permits "hardened" communication links at low cost. Optical fibers can also be used to build very sensitive detectors of a variety of physical effects, e.g., pressure, temperature, etc. Fiber optics is a high priority development area.

- o Adaptive optics and image compensation techniques. There has been great progress in the development of optical systems that compensate for atmospheric disturbances. This is important both for laser beam steering devices and for telescopes used in astronomy. Adaptive optics as well as compensation techniques are absolutely necessary for the development of high energy lasers that propagate beams over very long distances in the atmosphere. These technologies are, therefore, necessary for strategic defense and for other military applications.

- o Optical surfaces. Mirrors for high energy lasers must have special surfaces. Specialized coatings are necessary to reduce the heat loads imposed on the mirror material by the laser beam. Cooling techniques for mirrors must be developed as well. This is a difficult area but it is critical if high energy lasers are to be militarily useful.

(6) Energy. Energy technology is fundamental because energy is the motive force behind both the economy and national security. We discuss here technologies related to energy production, transmission, and natural resource recovery which are important from a broad national security point of view. Some critical development areas are listed below:

- o Hydrocarbon fuels. Conventional oil recovery, enhanced secondary and tertiary recovery, and the recovery of oil from shale must continue to have the highest priority since the economy and the military will be heavily dependent on oil for the foreseeable future. Work on shale oil is particularly important since the United States has huge shale oil resources. At the present time, shale oil recovery is not economical, but the investment in shale oil research and pilot plant development should be made, not on the grounds of economic benefit, but on the grounds of national security. This should have a high priority.



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- **Plant-based hydrocarbons.** There are some promising prospects of recovering "oil from plants." This refers to the use of genetic engineering to modify certain trees that produce hydrocarbons naturally in such a way that the hydrocarbons can be converted to hydrocarbon fuel products. These trees are similar to rubber trees that produce rubber latex, which is a natural hydrocarbon. Plant-produced alcohols as fuel additives also constitute a promising approach to the development of new oil substitutes. Research in this area must have a high priority for both civil and military applications.

- **Deep gas recovery.** There are interesting prospects for discovering new reservoirs of natural gas at depths in excess of 15,000 feet. Several have already been exploited. There is, moreover, a theory based on what has been learned in the research on the evolution of the planets in the solar system that suggest that very deep gas reservoirs may not be of biological, but of geochemical, origin. The reservoirs may accumulate gas from seepage of methane and other hydrocarbon gases produced in the earth's core which seep through the earth's mantle. If this theory proves to be true, then the natural gas found at such great depths would be a renewable, rather than a non-renewable, resource. If verified, then very high priority should be given to the development of deep drilling technique for both civil and military applications.

- **Propulsion.** Turbines operating at very high temperatures have proved to be most important for aircraft propulsion. The development of ram-jets and hydrogen fuel turbines for applications to the aerospace plane are on the horizon. There are important potential applications in that area, but they are rather long-term. Turbine engines will also be used for other vehicles. Some ships, tanks and automobiles are already driven by turbines, and more will be. Turbines must be operated at very high temperatures to compete with the efficiency of internal combustion engines. Cheap high-temperature turbines for automobiles and land vehicles will probably require the use of ceramic metal composites that are now in the test stage of development.

- **Power plant technology and electric power transmission.** Slow and incremental progress in power plant technology is to be expected due to the availability of better materials. Perhaps the most interesting development in this area is the potential to use superconducting

materials for electric power transmission. Transmission losses now account for 15 to 25 percent of the power losses between the producer and the user. Superconducting power transmission is, therefore, promising as an overall energy saving technology. Here, the military applications are minor.

- **Natural resource recovery.** This is considered here under energy because it is an energy-intensive technology. The United States has some natural resource problems that have been well documented. Oil is the most important one. The strategic oil reserve and maintaining domestic oil development are critical to the energy posture of the United States. Strategic material shortages exist, but these can generally be overcome by the development of substitute materials and by the use of known but currently uneconomic reserves of the same materials in this country. Most of the strategic material shortages that exist are not due to shortages of raw materials in this country, but rather to the fact that these materials can be developed more economically overseas.

(7) **Fluid mechanics.** There have been significant advances in fluid mechanics in the past decade because of developments in high-speed computers. Some new physics in the atomic and molecular areas have also been important, particularly in the understanding of chemically-reacting flows. Numerical solutions of non-linear differential equations with complicated boundary conditions have become possible. In addition, numerical solutions have led to new theoretical insights. Chaos theory and the macroscopic order phenomena in non-linear dynamics will lead to theories with good predictive capabilities in the next few years. Some applications of these are listed below:

- **Airplane and ship design and development.** Computers have become "numerical wind tunnels." This has reduced the time and cost of aircraft design. This is also true about ships. Computers are "numerical towing tanks" in the case of ship design. Both of these clearly are important for defense applications.

- **Weather forecasting.** Long-range large-scale weather forecasting is now reasonably good. The results depend on having accurate energy balance equations and good fluid mechanics equations with valid turbulence models to describe the atmosphere. Large-scale phenomena such as the jet stream, the trade winds, the more-or-less permanent low pressure areas over the North Atlantic and North Pacific can be predicted. It may be possible with better computers and some of the new theoretical

developments in fluid mechanics to make progress in predicting smaller-scale phenomena, such as hurricanes (scale about 300 miles), compared to those that can be done at present (scale about 1000 miles). Further into the future, thunder storms (scale about five miles or ten miles), even tornadoes (scale less than one mile) might be predictable. Good weather forecasting is of obvious military value.

- o Ocean engineering. This field is also strongly related to the understanding of fluid mechanics in the prediction of ocean currents, temperature gradients and other phenomena of importance to understanding the properties of the ocean. Applications to submarine warfare are obvious. Ocean engineering is also important for resource recovery operations. Underwater drilling for oil and perhaps recovering other resources from the ocean floor may become important eventually from an economic viewpoint and perhaps also for military purposes.

- o Properties of matter under high pressure. When materials are subjected to high-velocity impacts for example, the materials become fluid and the methods of fluid mechanics must be used to determine their behavior. Shaped-charge explosives also fall into this category. The question of how armored vehicles and ships can be damaged (and protected) is strongly dependent on this technology. The military value is obvious, and the priority is high because of recent Soviet advances in armor technology.

(8) Biotechnology. This is a field of great promise for the future. Biotechnology is the science of the application of physical science and technology to biological problems. Because of the strides made in various physical sciences, a corresponding impact on biotechnology is to be expected. Some of these are listed below:

- o Human factors. The behavior of people when dealing with machines is an important consideration in machine design. It is even more important in weapons systems because of the inherent danger of the situation in which weapons are employed. Weapons must be designed and built so that real people under great stress can operate them. This is an intellectual discipline that is sometimes ignored. It is a large and diffuse area but more must be done to apply it intelligently.

- o Prosthetic devices. This is perhaps the most promising field in biotechnology. The possibility of producing

artificial limbs actuated by real nerve impulses and guided by advanced sensors and computers is close at hand. Aids for sight and hearing losses are in various stages of development. There are obvious military applications of these technologies to the treatment of casualties.

- o **Interactive devices.** This term refers to devices that can be actuated by voice or other mechanical stimuli. There are, for instance, experiments on airborne fire control systems controlled by the movements of the pilot's eyes. Voice actuated systems are also in the experimental stage, for use in situations where the workload on the operator is high. The military implications are obvious.

- o **Protective systems for troops against various biological warfare agents.** The United States is far behind the Soviet Union in this area, and it is imperative that measures be taken to make up for the current disparities. This should be given an extremely high priority, and the work should take advantage of what is happening in materials technology, biotechnology and other fields.

- o **Intensive care equipment for field hospitals.** This work parallels what has been achieved in civilian hospitals. It could be most important for reducing deaths among military casualties.

(9) **Biomedicine.** Biomedical technology is different from biotechnology in that it depends on advances in medicine and biochemistry rather than electronics and other physical engineering disciplines. Aside from the obvious military applications in the treatment of casualties, there are several other important considerations that have to do generally with public health. The most important are listed below:

- o **Toxic agents and nerve gases and their antidotes.** Much work in this field has been done. Molecular biology is critical to the understanding of the possible effects and countermeasures for such weapons. These countermeasures include finding effective drugs to neutralize internal effects and agents to minimize problems caused by the exposure of the skin or the eyes.

- o **Infectious diseases.** This is still a problem in regions where wars are likely to be fought. Constant and sustained efforts are needed in order to minimize casualties from disease in the field. This is especially true after people are wounded.

- **New surgical procedures.** The treatment of combat casualties has traditionally led to the development of new surgical procedures for severe trauma cases. New physical techniques--lasers, for example, or cryogenic methods--are being exploited to expand the number of cases that can be resolved surgically.

# AIRPLANE AND AIRBORNE WEAPONS

Dr. Hans Mark

## I. Introduction.

The coming decade will see significant advances in aviation. There are at least four technologies described in this report that bear on the development of new and more capable aircraft and airborne weapons. To turn the new knowledge in these major technological areas into something useful depends on an assessment of how aircraft based on these new technologies might be employed for tactical as well as strategic purposes. It is the purpose of this essay to provide decision-makers with the necessary information to make such judgments.

The major technological areas most promising for advances in aviation are materials, aerodynamics, energy as applied to propulsion, and electronics. In the area of materials, there is good reason to believe that the "tailored materials" that have already been described will find major applications. Light weight, for instance, is always a requirement in aircraft construction. Good thermal properties are also important. There are, however, more exotic applications on the horizon having to do, for example, with materials that have anisotropic properties matched to the stresses and strains they experience when used as aircraft structural components. Many of the currently available composite materials already have properties of this kind and more developments in this area can be expected. Another most interesting feature of "tailored materials" is the incorporation of unusual electronic and electrical properties. Such materials have already found applications in the production of "low observables" aircraft, and further developments of this kind are to be expected as well.

In aerodynamics there has been a genuine breakthrough in the past decade as supercomputers have made it possible to calculate flow fields with much better accuracy than has even been possible before. This has had the consequence that the flow around very complex aerodynamic shapes can now be accurately modeled and results that have predictive value can be obtained. Supercomputers have indeed become the numerical windtunnels that were only imagined in the early 1970's. There have also been important increases in theoretical understanding, especially those dealing with turbulence and other chaotic phenomena. Computers have been able to develop numerical solutions for the highly nonlinear equations that describe aerodynamics (the various approximations of the Boltzmann equation, including the equation of Navier and Stokes). It is interesting that these

computer solutions have led to unsuspected regularities which are just now being understood. There is good reason to believe that new predictive methods dealing with highly turbulent flows will be developed in the coming years.

New technical advances in the field of energy production related to propulsion will also have most important consequences. The use of conventional hydro-carbon fuels in aircraft has reached a high degree of perfection with exceedingly efficient turbojet and turbo-prop engines. There is on the horizon, however, the possibility of burning hydrogen directly and thereby gaining as much as a factor of 50% in the efficiency of the engine. What makes this possible is the technology that has been developed to handle large quantities of liquid hydrogen for space flight. The development of a new generation of turbine engines or hybrid turbine-ramjet engines that burn hydrogen as the primary fuel should be anticipated.

Advances in electronics will also have an important impact on aviation in the coming years. Smaller computers have always been useful in airplanes and this is expected to continue since computers are still expected to become smaller. Sensor technology is equally important, and these together should make it possible to improve navigation significantly so that position determinations to an accuracy of a few feet of even very rapidly moving objects should be possible. There are obvious implications for tactical applications, such as targeting, that would accrue if these advances could be turned into practical technology.

The application of new knowledge outlined for these four major technological areas will lead to new types of aircraft. In discussing these it is useful to divide the time horizon into the "near term," which is defined as the next five years, and the "far term," which is defined as the next fifteen years. Beyond that, it is not possible to say anything that is really useful in terms of practical airplanes. Three new types of airplanes that will be available in the near term: Low observables or stealth aircraft; Vertical Take-Off and Landing (VTOL) and Short Take-Off and Landing (STOL) aircraft, and Remotely Piloted Vehicles (RPVs) will be discussed. Three other types of aircraft are likely to be available in the longer term: Long-Duration Patrol Aircraft, Heavy-Lift Cargo and Tanker Aircraft and the Aerospace Plane/SR71 follow-on. These will also be dealt with in this paper. The six types of aircraft that have been defined are being fielded or may be developed because of the advances made in the four technological areas that have been described.

II. Specific Descriptions of New Aircraft. (Near Term).

(I). Low Observables Aircraft.

Aircraft that have very small radar cross sections and that also have low visual and infrared signatures are becoming available. This development is one of the important technical contributions made during the 1970's. Before these aircraft can be usefully employed in the field, much testing will be necessary. Indeed, it is likely that the really important question will be to determine how such aircraft can be used most effectively in the military sense. What weapons will these aircraft carry? Will the weapons compromise the low observables properties of the aircraft? What are the tactical and strategic doctrines of employment for low observables aircraft? These are important questions that must be answered before low observables aircraft of the kind that are now being fielded become militarily useful. Edward Luttwak, in a recent book on strategy has stressed the importance of such field tests whenever a new technology is introduced. Unless this is done properly, it may very well be that the originally expected tactical advantages of the new technology do not materialize. Having made the investment in low observables technology, it is now most important to learn how to apply it with maximum effect.

(2). Vertical Take Off and Landing (VTOL) and Short Take Off and Landing (STOL) Aircraft.

There are, of course, thousands of helicopters in service already and these are genuine VTOL airplanes. They are not included in this discussion, which deals with new VTOL and STOL concepts that have much better capabilities in terms of speed, range or payload than do helicopters. Several types of these new VTOL and STOL aircraft are already in existence. Furthermore, there are plans to produce them in quantity so that they will be coming into the inventory in large numbers during the decade of the 1990's. The creation of a new generation of VTOL and STOL aircraft is another consequence of technology developments accomplished in the decade of the 1970's. Specifically, the three new aircraft coming into the inventory are the McDonnell Douglas-British Aerospace AV-8B,a fighter bomber with vertical take-off and landing capability; the Bell V-22 Osprey, a small transport based on the tilt-rotor VTOL principle; and the McDonnell Douglas C-17, a large transport aircraft that has short take-off and landing properties.

In the case of AV-8B, much is already known about its combat capabilities, since it is a derivative of the British-Aerospace Harrier aircraft that has been in operation for many years and which saw action during the Falkland Islands War in 1983. The hope is to use these aircraft to create a tactical air force that is relatively independent of elaborate ground-based facilities. It is true that the value of this independence is not recognized today. Very probably this has to do with the

combat experience of almost all of the leaders of the modern U.S. Air Force. They fought in Korea and in Vietnam, and during both these conflicts our air forces operated from airfields that were protected by political "sanctuary" agreements. While it is true that some of these "agreements" were tacit, they were nevertheless observed. Therefore, our combat leaders have little or no experience operating airfields that are under attack and are therefore likely to undervalue aircraft that could survive and operate without air bases. Our naval aviators have had similar experiences. Both in the Korean and in the Vietnamese Wars, our aircraft carriers were never attacked. Thus, the leaders of our naval aviation establishment have no direct experience in the operation of combat aircraft from ships that are under attack. The extremely large aircraft carriers the Navy now operates were built to accommodate high-performance aircraft. There are many people who believe that these large ships are vulnerable in spite of the enormous effort that has been made to provide defensive systems for them. The existence of an effective VTOL fighter aircraft would permit the Navy to operate such airplanes from a great many different kinds of ships. In the Falkland Islands War, Harrier aircraft actually took off from the decks of cargo ships. It is no longer necessary with such airplanes to design special ships to handle aircraft. The offensive striking power of a modern carrier task force is remarkably small compared to its cost. Right now the offensive power of a large U.S. carrier task force is lodged in 24 Grumann F-14s and everything else in the task force is there to defend that relatively small strike force. The use of a large number of VTOL aircraft such as the AV-8B on many different types of ships might correct this situation by making more aircraft available for offensive combat missions.

The Bell C-22 Osprey tilt-rotor transport aircraft is the culmination of a long development process. Application of the tilt-rotor concept provides an airplane with the VTOL capability of a helicopter and, in forward flight, the performance of an efficient turbo-prop aircraft. This is accomplished by tilting the axis of the rotors (along with the engines mounted on the wing tips) from the vertical during take-off to the horizontal during forward flight. The successful development of the Bell XV-15 experimental tilt-rotor aircraft during the 1970's was possible because of advances in materials and control technology. The utility of this VTOL concept for a variety of purposes has been recognized by the Marine Corps (for shipborne assault transport aircraft) and the Navy (for shipborne ASW aircraft and for carrier on-board delivery aircraft). One thousand V-22 Osprey aircraft are now being built. Once these are available, much needs to be done in terms of field exercises to explore their tactical utility.

The existence of the McDonnell-Douglas C-17 represents a considerable enhancement of air transport capability, especially

in local theater situations. The long range of the C-17 will be particularly useful because it will allow delivery of troops and equipment to unprepared airstrips overseas directly from the continental United States.

There is another application for STOL transport aircraft that should be very seriously considered. There is no doubt that the United States will have fewer bases overseas ten years from now than it has today. This means that refueling capabilities have to be enhanced in order to make our air forces more independent of overseas bases. One way to do this is to operate STOL capable Lockheed C-130-type tanker aircraft from ships (a test conducted about 15 years ago proved that a C-130 can indeed takeoff and land on a large aircraft carrier). These aircraft would be operated from large converted oil tankers that could be placed anywhere in the world. The C-130-type aircraft could then refuel any group of airplanes traveling overseas from the continental United States by locating the refueling ships in the appropriate places. This is one of many possible applications of STOL technology.

All of these developments are potentially important and should be adopted by the appropriate military services.

(3). Remotely Piloted Vehicles.

The most important application of remotely piloted vehicles is, of course, weapons delivery. Cruise missiles are unmanned vehicles with an automatic pilot, they are already in existence, and it is most important now to explore vigorously the tactical and strategic utility of cruise missiles.

Other remotely piloted vehicles are also carrying out specialized functions, the most important probably, reconnaissance and targeting. There are likely to be important advances in the technologies that are relevant to the development of better remotely piloted vehicles. Specifically, these are related to better sensors and smaller computers which will make smaller and more effective RPVs possible. In the case of remotely piloted vehicles as well, it is probable that the development of tactical and strategic doctrines for their employment should have first priority. Once the right ideas for employment are developed, the proper technical development can be based on them.

III. Specific Description of New Aircraft Types. (Far Term).

In the longer term, the following kinds of new aircraft can be anticipated:

(1). Long-Duration Patrol Aircraft.

The Lockheed P-3 is now the mainstay of naval patrol aircraft, and it is the patrol of the oceans that would be the primary function of new long-duration patrol aircraft. The flight of the "Voyager" around the world dramatically demonstrated some of the technical advances that have made long duration flight possible. One can anticipate that patrol airplanes with an endurance of several days are on the technical horizon. These would be large airplanes flying at relatively high altitudes at relatively slow speed. They probably would be propelled by highly efficient turbo-prop engines (probably the closet thing to such an aircraft in existence today is the Russian TU-95 Bear patrol airplane). The principal mission of these airplanes would be anti-submarine warfare and ocean surveillance, and they would carry the normal complement of weapons for ASW and attacks on surface ships.

Long-duration patrol aircraft could also carry other weapons. It has been suggested that if they were armed with efficient kinetic energy kill rockets or perhaps with high energy lasers they could also be employed to shoot down submarine launched ballistic missiles (SLBM's). A project to demonstrate how high energy lasers can be operated on airplanes was carried out by the Air Force in the 1970's. It was called the Airborne Laser Laboratory and consisted of a large laser mounted in a KC-135 aircraft. At the end of the program, the laser was used to shoot down five sidewinder missiles fired on trajectories close to the aircraft. A capability of this kind might help to neutralize the Soviet submarine threat. It may be especially important to do something like this now because the new quiet Soviet submarines that recently have begun to be deployed will make traditional ASW more difficult. The aircraft would then operate as part of a strategic defense system.

There are, of course, other applications for long duration airplanes of this kind, such as carrying cruise missiles or employment as tankers. These should be thoroughly explored.

(2). Heavy Lift Cargo/Tanker Aircraft.

The largest transport aircraft operating today have gross take-off weights of approximately three-quarters of a million pounds. The technologies to develop much larger airplanes are on the horizon, and these include materials, propulsion and control. One can think, for instance, of very large seaplanes with gross take-off weights in the region of two to three million pounds. Such very large airplanes would probably be the first candidates for the hydrogen fuel option that has been mentioned. The point is that a very large airplane can carry the low density hydrogen fuel and keep it cold much more easily than a smaller airplane, where both payload and volume are limited. The higher efficiency of hydrogen-burning engines would be most useful in this application. The Soviets have done some work on very large

aircraft that fly close to the surface of the sea which may be aimed at developing heavy lift cargo/tanker aircraft.

A fleet of such large transport airplanes would add flexibility to the military logistics system. They could be extremely important because overseas bases are less likely to be accessible in the future than they are now. Finally, aircraft of this kind could have important applications as tankers. The operation executed by the British during the Falkland Islands War is instructive in this respect. They staged a flight of a Vulcan strategic bomber from Ascension Island to bomb Port Stanley on West Falkland Island. The total distance flown on the round trip was over 4000 miles. The British had to employ a total of 17 Victor tanker aircraft to stage the mission. With larger tanker aircraft, fewer tankers could have done the job and the risk of failure would have been smaller.

(3). Aerospace Airplane/SR-71 Follow-On.

President Reagan made a commitment in his 1986 State of the Union Speech to build the Aerospace Plane. Technologically, this is a very demanding proposition. The creation of a successful Aerospace Plane would draw on all of the technologies that have been mentioned. A step toward the development of the Aerospace Plane might be the development of a less capable aircraft which would perform significantly better than the Lockheed SR-71. .Such an airplane might be very useful for wartime reconnaissance, and it could supplement our reconnaissance satellites in peacetime. In wartime our satellites are likely to be gone because they are vulnerable to Soviet anti-satellite measures. Airplanes of the kind described here might be good substitutes. Overflight is possible in war but not in peace, and this is an important consideration. Building an SR-71 follow-on airplane using new technology should be traded off in terms of cost and effectiveness against the construction of a more survivable satellite system.

IV. A Special Topic in Aviation.

Fifty years ago, the distinguished British mathematician, Professor Frederick William Lanchester, developed a relationship that has since become known as "Lanchester's Law." Lanchester's Law says that under certain conditions the measure of combat effectiveness of a military force goes as the square of the number of the units (people, aircraft, tanks, ships) involved and only linearly as the quality of the unit. ("Quality" here is determined in terms of speed, firepower, armor and other considerations of this kind.) One can quarrel with the assumptions made by Professor Lanchester to derive this theorem, but the basic insight that force levels are important in warfare is certainly correct. Lanchester's power law is probably also

correct under many circumstances and it is for this reason that we need to be concerned about how business is done in the United States today. The fact is that the quantity of airplanes that we field today in our tactical air forces is much too small. Except for heavy bombers, the Soviets outnumber the U.S. in every category of combat aircraft.

American combat air forces generally have only small numbers of aircraft because the unit cost of airplanes is so high. A fighter aircraft such as the Grumann F-14 today costs over $30 million when fully equipped, which is a factor of over 100 more than the cost of a similar airplane in World War II. (The Lockheed P-38 had a unit cost of less than $300,000.) Inflation in the intervening period might account for a factor of ten but not for a factor of 100!

Why are airplanes today so expensive compared to those built in World War II? Part of the answer is that current technology is more sophisticated but, part of it is that the airplanes we build today are built with a different philosophy from those that were built in World War II. Combat aircraft today are built to last twenty or more years. They are constructed essentially for "peacetime" operations, or for situations where loss rates are predictably small. In combat, the "half-life" of an airplane which is used against similar kinds of air forces is likely to be a few hours or some days at most. That certainly is the experience, for example, in recent Arab-Israel conflicts in which air forces were intensively employed on both sides. If airplanes in combat last only a few hours or days, why should they be constructed to survive for twenty or twenty-five years under "peacetime" conditions? What does it cost to build an airplane which can be flown for such a long period of time?

When compared to the construction techniques that were employed in World War II, we pay much more attention to details and use much more expensive materials today than we did during World War II. Would it be possible, for example, to downgrade the materials and to put together the structure and the engines of modern aircraft with less sophisticated techniques in order to lower both airframe and engine costs? Would it be possible to use less expensive materials and less extensive testing programs but still maintain the high performance configurations of our combat aircraft? Would it be possible, in short, to build a "cheap" version of the General Dynamics F-16 and the McDonnell-Douglas F-15 using the techniques just described? The answers to these questions are not known, but perhaps it would be instructive to examine them.

Another expensive item is the electronic navigation and fire control system that is currently put on our first-line combat airplanes. Is it necessary, for example, to have the same

electronic and avionics suite on every airplane in the fleet? Is it possible to initiate a "leader-follower" concept in combat that would make it possible for one aircraft, say, in five, to have the full avionics and electronics equipment and for the other five to have less capable equipment and play "follow-the-leader" in combat? What would be a reasonable estimate, for instance, of the equipment that could be eliminated from the expensive electronic suite and still retain significant combat capability for the "follower" airplanes that would not have the suite? None of these questions has ever been dealt with in detail.

The basic proposal is to see whether it is feasible to think about having two versions of the same aircraft. One would be the all-up "peacetime" version, built to last for twenty to twenty-five years with all the relevant electronics, avionics, and fire control systems built into the airplane. These would be the front-line "leader" aircraft in war. At the same time, we would build a larger number of "wartime" airplanes which would have the same aerodynamic configuration as the "peacetime" aircraft, but would be shorter lived and would have less capable avionics, electronics, and fire control systems. Hopefully, the "wartime" airplanes would be considerably cheaper and would be built in large numbers. In terms of operational employment, the idea would be to do training and familiarization, tactical airplanes would be flown less often but would, of course, be employed in full-time training exercises.

There is no doubt that the number of aircraft we now deploy is too small compared to the expected loss rates in intense combat. The essential question about this proposal that must be answered is how much less the "cheap" airplanes proposed here would cost to build. If the "follow-the-leader" principle is rigorously applied in developing combat tactics, would it be possible to reduce the cost of the "wartime" aircraft by as much as a factor of two or three over their "peacetime" equivalents? This question has never been dealt with and our technical expertise has never really been brought to bear to look at this proposal. A factor of two or three in cost would be interesting because it would double or perhaps even triple the combat strength of American air forces.

In considering this matter, it is important to remember that the Soviets actually do something like what is proposed here. They have more combat aircraft than we do primarily because they keep aircraft in the inventory longer than we do. They are still flying Mig-17's and Mig-19's. Even though these airplanes are not as capable as the first-line aircraft they have, the Soviets believe that they could be useful in combat. If nothing else, they add to Soviet numbers, and in the confusion of combat they may significantly reduce the edge we think quality provides. In this way, the Soviets show that they have

understood Lanchester's law better than we have. They have roughly the same number of "first-line" combat as we, but a huge reservoir of old and still somewhat capable airplanes to throw into a battle if that has to be done. It is true that there are maintenance and operations costs for doing this. However, they pay less attention to that than we do, and apparently believe that the cost is worth it. At the very least we should determine whether what is proposed here is technically feasible. A study team should be put together to look at the question.

# DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1991

MONDAY, APRIL 2, 1990

U.S. SENATE,
SUBCOMMITTEE ON DEFENSE INDUSTRY AND TECHNOLOGY,
COMMITTEE ON ARMED SERVICES,
*Washington, DC.*

## DEFENSE MANUFACTURING TECHNOLOGY AND QUALITY ASSURANCE PROGRAMS

The subcommittee met, pursuant to notice, at 2:05 p.m., in room SR-222, Russell Senate Office Building, Senator Jeff Bingaman (chairman of the subcommittee) presiding.

Committee members present: Senators Bingaman and Lott.

Professional staff members present: William H. Smith.

Minority staff members present: Romie L. Brownlee, deputy staff director for the minority; Jonathan L. Etherton, professional staff member.

Staff assistant present: Melissa Ann Ramsey.

Committee members' assistants present: John Gerhart, assistant to Senator Bingaman; Charles C. Smith, assistant to Senator Dixon; Charles G. Pearcy, assistant to Senator Lott; Eric H. Thoemmes, assistant to Senator Coats.

Senator BINGAMAN. The hearing will come to order.

### OPENING STATEMENT OF SENATOR JEFF BINGAMAN, CHAIRMAN

Senator BINGAMAN. The subcommittee today receives testimony on two vitally important defense acquisition programs: manufacturing technology and quality assurance.

History has amply demonstrated that a nation cannot continue to possess economic and military might if it does not possess an efficient and effective means to produce the goods and the weapons on which it must depend.

More recent history has shown that the technologies developed by scientists and engineers can be as important toward improving our manufacturing processes as they are in developing products to be manufactured. Other nations appear to recognize this more than we do here in the United States.

Our defense technology and industrial bases remain strong, but almost all of the trends are in the wrong direction. Outside of defense, we in America have seen one industry after another wither, and sometimes die, under the onslaught of foreign competition.

Often we say the competition is unfair, that foreign companies benefit unfairly from the protection of their governments, and in many instances this is the case.

This afternoon, we will have testimony from four witnesses who are well qualified to address the manufacturing and quality improvement programs that are in place and things that can be done in this area.

Mr. Richard Donnelly is a familiar witness before the subcommittee. He has appeared twice before to discuss DOD's industrial preparedness activities. Mr. Donnelly is the Assistant Deputy Under Secretary of Defense for Manufacturing and Industrial Programs. He has substantial experience in the production and manufacturing area. Of course, we look forward to his testimony.

Accompanying Mr. Donnelly on the first panel is Mr. Willis Willoughby. Mr. Willoughby is the Navy's Director of Product Integrity and is one of the Nation's most experienced senior professionals in the area of reliability, quality, and producibility.

Before joining the Navy, Mr. Willoughby worked for NASA, where he developed many of the techniques which he subsequently introduced into Navy weapon systems. He is the father of the "best practices approach" to both design and manufacturing, and he chaired a Defense Science Board Study Group that converted his concepts into practical guides for designers and manufacturers.

We welcome him to our subcommittee and look forward to his testimony as well.

On the second panel, we have Mr. Gordon Frank, who is the Director of the Total Quality Management Support Office, which is engaged in efforts to improve quality and industrial productivity practices. Mr. Frank is another of DOD's true professionals in these areas, with experience dating back to the early 1960s. We welcome him here this afternoon to testify on the Department's TQM activities.

Finally, we welcome back another person who has testified many times before in this committee, and that is Dr. Robert Costello. Dr. Costello was the Under Secretary of Defense for Acquisition during the Reagan administration and initiated much of the good work in manufacturing and quality assurance that is ongoing now.

He directed preparation of the Department's bolstering industrial competitiveness report and began implementing its recommendations before his departure from the Pentagon. He now is a Senior Fellow at the Hudson Institute, where he continues to work on defense industrial base issues.

We are very pleased that he could come and testify again today.

The subcommittee will hear now from the first panel, Mr. Donnelly and Mr. Willoughby, and then will ask the second panel to come forward.

Mr. Donnelly, why don't you go ahead with your testimony, please.

You can either summarize it or proceed however you would prefer. I do think if you could do it in about 10 to 15 minutes at the most, that would be helpful to us.

**STATEMENT OF RICHARD E. DONNELLY, ASSISTANT DEPUTY UNDER SECRETARY OF DEFENSE FOR MANUFACTURING AND INDUSTRIAL PROGRAMS**

Mr. DONNELLY. Thank you very much, Mr. Chairman.

My statement is a little long to try to get it in within 10 or 15 minutes, so with your permission I will summarize.

I appreciate the opportunity to come and discuss defense manufacturing technology programs. Manufacturing is receiving increasing emphasis as the internationalized markets present domestic manufacturers with competitive challenges from abroad.

This concern was also expressed in recent legislation calling for a report on industries critical to the national defense. Your letter inviting DOD testimony requests the status of that effort.

The legislation, as you well know, sir, requires that the March 1990 Defense Critical Technologies Plan identify manufacturing processes and industrial base capabilities for up to 20 technologies. Last week, I believe you were briefed on our report for this year by our technology people, led by Dr. Herzfeld.

We examined the 20 technologies in that plan as part of our work and surveyed our manufacturing technology communities to identify those manufacturing capabilities supporting each of the technologies listed.

As you might suspect, the responses we received from our MANTECH people varied, depending upon the maturity of the technology. Obviously, the more mature technologies, like semiconductor materials, microelectronic circuits, and composite materials, are developed far enough to identify specific manufacturing capabilities.

Conversely, the manufacturing capabilities are difficult to define for those technologies that have not matured beyond the basic research phase. Expertise for these technologies still resides in the labs or universities in government and in industry, rather than at production facilities.

But I might say, parenthetically, that I think the concurrent engineering concept kind of says let's try to collapse this universe together. We need to get people in the laboratories thinking more about production, and, obviously, our production-based community needs to rethink the R&D phase.

The second requirement in last year's act requires the submission of the Defense Industrial Base Report. The most challenging aspect of this requirement is the identification and analysis of industries critical to the application of the Defense Critical Technologies Report.

Our approach to this analysis was provided to the Congress on March 15 of this year, and the report will be ready this coming September.

We have already started an in-depth review on microelectronics, machine intelligence, robotics, and superconductivity.

These first areas are teaching us about approaches, scope of effort, and the staffing needs.

Just in the area of microelectronics, for example, we have identified several supporting industrial sectors, including lithography, wafer processing, packaging and assembly, and gallium arsenide, just to name a few.

Other technologies are so early in the research and development process that no manufacturing capabilities exist. Frankly, much of the manufacturing community is just trying to understand how the technology can be applied.

The Critical Industries Report is just one of the ongoing actions relating to the defense industrial base. Let me just touch on the status of DINET, the Defense Industrial Network, for a minute or two here.

We now have a prototype system which is operational and being used by about 100 DOD analysts, I believe.

We are examining the feasibility of expanding DINET into a gateway providing access to information available in other systems. What I really mean by "gateway" is using DINET to access a number of other existing data bases in a very intelligent way to try to get us answers on some of these industrial base issues.

Our intent is to bring DINET under the umbrella of a new Corporate Information Management, or CIM, program, which will allow us to field a working full-scale system more rapidly. In the meantime, the DINET capability already developed will continue to be used and maintained.

I might give a few examples of how DINET is used. We have used it on assessing mergers and acquisitions in the economy. We used it to identify key counties and industrial activities affected by the California earthquake, and other assessments of the industrial base activities.

We are also taking a look at the SOCRATES program, which is operated by the Defense Intelligence Agency, to determine how it can complement the capabilities of DINET. The DIA will discontinue funding certain elements of the SOCRATES project this year, and we are evaluating what impact that reduction might have on DOD's technology assessment capability.

We have found that similar technology assessment capabilities currently exist within the intelligence community and at the Institute for Defense Analysis, which is a Federal contract research center that supports us.

Another activity relating to assessments of the industrial base responds to a requirement in the 1989 Defense Authorization Act, which directs the Department to develop a process for performing industrial base analyses on new weapon systems. We are currently conducting industrial base assessments on several of these systems.

The linkage between the industrial base and defense production requirements was stressed in 1988, when we established the Defense Manufacturing Board, or DMB. However, after studying the activities of the board, we decided that consolidating it with the Defense Science Board, or DSB, provides us a more complete perspective by allowing manufacturing issues to be addressed along with the issues of R&D.

Again, I think this is under the concept of concurrent engineering, that says let's put these communities together and force the coordination among them.

In response to the question in your letter, studies that began under the aegis of the DMB are continuing under the Defense Science Board (DSB) sponsorship. The DSB intends to treat manufac-

turing as a key element in the development and production of weapon systems.

The four key reviews being done under the DMB we expect will be completed during May.

Your letter also asks about centralizing the management of manufacturing technology programs. As you pointed out in your opening remarks, Senator, two programs for improving the efficiency and quality of defense production are the MANTECH Program and Industrial Modernization Incentives Program, or IMIP, as we call it.

Management of both programs is centralized in a single office within the Office of the Secretary of Defense. I will not spend a lot of time discussing the background of MANTECH. I think you are familiar with its history. It has been around for a number of years and has a significant payoff in terms of investment.

One of the things that I do want to mention, though, is that we are restructuring the program to make it more effective by developing a top-down strategic plan that will guide service and agency investments and improve administrative oversight mechanisms.

What that says, in English, is that we are creating 10 to 12 major thrust areas that we want the program to operate under. Those thrust areas have been created with the help of the military departments, and we intend to operate that program, or at least 80 percent of that program, under those 8 to 10 key thrust areas in the future.

Senator BINGAMAN. Is this MANTECH or IMIP?

Mr. DONNELLY. That is MANTECH for now, sir, and IMIP perhaps later. I can get to that in a little bit more detail later on in the hearing, if you wish.

IMIP, which you asked Dr. Broedling about, differs from MANTECH by focusing on the modernization or improvement of existing production facilities.

Basically, IMIP is one of the best customers, or should be one of the best customers of the MANTECH program. When we developed the generic manufacturing technologies, the key to it, the real key to these things, is get them applied and get them out on the factory floor. That is where IMIP can play a key role.

We also invest in manufacturing technology through the Defense Advanced Research Projects Agency (DARPA) Manufacturing Office and through weapons systems program offices.

The DARPA programs tend to have high value and high visibility, SEMATECH being the most current example.

A significant amount of manufacturing technology is also developed under our weapons acquisition programs. However, the actual amount invested is included in the overall cost of the program and is not easily distinguishable.

Another strategy aimed at promoting efficiency and quality is Total Quality Management. Mr. Frank will be discussing that later in the second panel. But it is an important concept and is something that goes hand-in-hand with improvement in our manufacturing well-being.

Another question you asked in your letter of invitation has to do with the DOD Industrial Preparedness Programs and the reason

funding request levels were reduced from the amounts authorized and appropriated for fiscal year 1990.

The Industrial Preparedness Program Budget category comprises several activities, including MANTECH and IMIP, as well as the Industrial Facilities Program and the Industrial Preparedness Planning Program. These industrial preparedness programs must compete for resources with other DOD programs and funding levels and are determined by defense priorities. Invariably tradeoffs need to be made, and we believe the requested level for fiscal year 1991 will adequately satisfy industrial preparedness requirements.

But I would add, parenthetically—and we can get into this more later if you wish—that I really believe the thrust area concept that we are coming up with is absolutely totally necessary in order to continue funding in MANTECH and perhaps to increase it in later years. If we cannot show how these individual projects and techniques can be carried out under an over-arching strategy, if we cannot show that, then it makes our job a lot tougher selling it through the people who watch over our budget within the Defense Department and over here on the Hill.

I would like to respond to another question in Dr. Broedling's invitation concerning the Qualified Manufacturers List, or QML, program.

The use of QMLs is another way DOD is trying to become a better customer. This process is similar to the old Qualified Products List, or QPL, which lists those items qualified for DOD procurement.

Although the QPL process has worked well, the testing needed to establish QPLs is becoming a burden for manufacturers, especially in the electronic microcircuit area.

To address this problem, we are evaluating the use of QMLs, which list those manufacturers we certify as qualified to produce a range of products. The pilot QML program is currently underway.

One other thing that I would mention before closing, sir, is the concept of industry consortia.

We have been instrumental in supporting R&D consortia for semiconductor manufacturing, machine tools and precision optics. I just think that the consortia approach is a neat idea. I like the idea of DOD being able to help stabilize the situation, or become a catalyst and then allowing industry to proceed on its own. Certainly, the concept of extending the consortia to production, as was recently mentioned by President Bush in his address to the National Association of Manufacturers is also a good idea.

I think that pretty well summarizes my testimony, Mr. Chairman. I will be pleased to answer any questions you may have. Thank you.

[The statement of Mr. Donnelly follows:]

PREPARED STATEMENT BY RICHARD E. DONNELLY
ASSISTANT DEPUTY UNDER SECRETARY OF DEFENSE
FOR MANUFACTURING AND INDUSTRIAL PROGRAMS

Mr. Chairman and members of the subcommittee, I appreciate the opportunity to be here to discuss defense manufacturing technology programs. I think we all agree that economic and industrial power provides the basis for military power and that the state of manufacturing in the U.S. has implications for national security.

The interest in manufacturing is receiving increasing emphasis as internationalized markets present domestic manufacturers with competitive challenges from abroad. This concern was expressed in recent legislation calling for a report on industries critical to the national defense. Your letter inviting DoD testimony requests the status of that report.

The legislation requires that the March 1990 Defense Critical Technologies Plan identify manufacturing processes and industrial base capabilities for up to twenty technologies. We examined the twenty technologies in that plan and surveyed the manufacturing technology communities in each of the military services to identify the manufacturing capabilities that are either in place or planned to support each of the technologies listed. The responses varied, depending on the maturity of the technology. The more mature technologies like semiconductor materials, microelectronic circuits, and composite materials are developed far enough to identify specific manufacturing capabilities. Conversely, the manufacturing capabilities are difficult to define for those technologies like weapon systems environment, data fusion and computational fluid dynamics that have not matured beyond the basic research phase. Expertise for these technologies still reside in laboratories or universities rather than at production facilities.

The manufacturing and industrial community has benefited from the learning process on the first two Defense Critical Technologies Plans. The authors of those plans saw a need to subdivide their effort into individual technology teams. We are utilizing this structure to unite the R&D and manufacturing communities for individual technology-industry sectors.

A second requirement in last year's act requires the submission of the Defense Industrial Base Report. The most visible and challenging aspect of the report requirement is to identify industries critical to the application of the Defense Critical Technologies, and to include an analysis on the condition of these industries. We have organized an approach for this analysis which was provided to the House and Senate Armed Services Committees on March 15, 1990. We will provide the Critical Industries Report in September 1990.

We have already started an in depth review on selected technologies such as microelectronics, machine intelligence/robotics, and superconductivity. These first areas are teaching us about approaches, scope-of-effort, and staffing needs. Our current thrust is to work with the defense R&D community identifying critical

technology elements or challenges, then link the technology challenges to specific industrial base, or industry sectors. We are working to identify separate sectors by end item or product manufacturers, equipment and material suppliers, and related industries. Just in the area of microelectronics for example, we have identified several industrial sectors. These include lithography, wafer processing, packaging and assembly, and gallium arsenide, just to name of few. Other technologies are still so early in the research and development process that no manufacturing capabilities exist, and frankly, much of the manufacturing community is just trying to understand how the technology can be applied. As you might expect, we are finding that several technologies are interdependent.

The Critical Industries Report is just one of the ongoing DoD actions relating to the industrial base. Understanding the need for a better manufacturing base information system, the DoD developed DINET. A prototype is operational and now being used by DoD analysts. We are examining the feasibility of expanding DINET to provide more industrial base information by serving as a gateway to other systems operated by the Services and DLA. We are working to bring responsibility for the DINET gateway under the umbrella of the DoD's new Corporate Information Management (CIM) program. If DINET meets the criteria for a CIM project, we will be able to field a working full scale system more rapidly than if we were to try and upgrade DINET as a separate program. In the meantime, the DINET capability already developed will continue to be used and maintained.

We are also reviewing the SOCRATES program operated by the Defense Intelligence Agency to determine how it could complement the capabilities of DINET. The DIA will discontinue funding certain elements of the SOCRATES project this year and we are evaluating what impact that reduction might have on DoD's technology assessment capability. Similar technology assessment capabilities currently exist within the intelligence community and at the Institute for Defense Analysis, a Federally Funded Research and Development Center.

Another activity relating to assessments of the industrial base responds to a requirement in the 1989 Defense Authorization Act which directs the Department to develop a process for performing industrial base analyses on new weapon programs. We are currently conducting industrial base assessments on the Advanced Anti-tank Missile, MK-50 Torpedo, and the Short Range Attack Missile. Our experiences analyzing the industrial base for these three systems will provide a basis for the process to be used on future acquisition programs.

The linkage between the industrial base and defense production requirements was stressed in 1988 when DoD established the Defense Manufacturing Board (DMB). After studying the activities of the DMB, we decided that consolidating the DMB with the Defense Science Board (DSB) will provide a more complete perspective by allowing manufacturing issues to be addressed along with issues of research and development. In response to the question in your letter, studies that began under the aegis of the DMB are continuing under DSB sponsorship. The DSB intends to treat manufacturing as a key element in the development and production of weapon systems.

The invitation letter also asks about centralizing the management of manufacturing technology programs. To successfully meet the competitiveness challenge in manufacturing, U.S. companies must produce high quality, world class products using efficient methods of production. Two programs for improving the efficiency and quality of defense production are the Manufacturing Technology Program (ManTech) and the Industrial Modernization Incentives Program (IMIP). Management of the ManTech and IMIP programs is centralized in a single office within the Office of the Secretary of Defense.

ManTech is a broad based, production oriented program that supports DoD research, development and acquisition by providing new and innovative manufacturing technology for the economical, timely and reliable production of DoD materiel. ManTech investments are viewed as "seed money" and expected to result in a "factory floor" application of productivity enhancing technologies. The program has been a component of our industrial base programs for a number of years and continues to provide manufacturing technology needed by the DoD. We have begun restructuring the program to make it more efficient and effective by developing a strategic plan that will guide service and agency investments and improve the administrative and oversight mechanisms. The restructuring will allow us to focus resources on certain generic problems and enable us to more effectively support technology development efforts.

IMIP, which you asked Dr. Broedling about, differs from ManTech by focusing on the modernization or improvement of existing production facilities. The IMIP allows contractors to overcome some of the disincentives inadvertently built into routine DoD contracting procedures, such as having prices renegotiated when a contractor cuts costs through facility modernization.

IMIP is active within all of the Services and Defense Logistics Agency but the Air Force has had the most aggressive program. Within the past few years, IMIP has begun to focus on the important subcontractor base providing these critical, lower tier producers the financial benefits resulting from productivity and quality improvements.

DoD also invests in manufacturing technology in two other ways: through the DARPA Defense Manufacturing Office and through weapons systems programs. The DARPA programs tend to be high value, high visibility, and high management attention programs such as SEMATECH. A significant amount of manufacturing technology is also developed under our weapons acquisition programs; however, the actual amount invested is included in the overall cost of the program and cannot be easily distinguished.

Another strategy aimed at promoting efficiency and effectiveness is Total Quality Management. Dr. Broedling, Deputy Under Secretary of Defense for Total Quality Management, is on the second panel and will elaborate further on this important concept.

Another question asked in the invitation letter addresses DoD industrial preparedness programs and the reason funding request levels were reduced from the amounts authorized and appropriated for Fiscal Year 1990.

The Industrial Preparedness Program budget category comprises several activities including ManTech and IMIP as well as the

Industrial Facilities Program, and the Industrial Preparedness Planning Program. The Industrial Facilities program includes the acquisition, maintenance, and support of government owned industrial facilities like shipyards and maintenance depots. The Industrial Preparedness Planning Program addresses the emergency planning function by assessing industry's ability to produce the critical items needed for a war or mobilization.

The industrial preparedness program must compete for resources with other DoD programs and funding levels are determined by defense priorities. Invariably trade-offs need to be made. We believe the requested level for Fiscal Year 91 will adequately satisfy industrial preparedness requirements.

Dr. Broedling's invitation letter asks about the Qualified Manufacturers List (QML) program. The use of QMLs is another way DoD is trying to become a better customer. This process is similar to the Qualified Products List (QPL) which has been used for several years to quickly procure items requiring lengthy or expensive testing. By having potential suppliers submit their products for testing prior to any actual procurement, we are able to create a list of qualified products from which procurements can be made. Although the QPL process has worked well, the testing needed to establish QPLs for the large array of complex products in the electronic microcircuit area for example, is becoming a burden for manufacturers. To address this problem we are evaluating the use of QMLs which list those manufacturers we certify as qualified to produce a range of products. A pilot QML program is currently underway with several microcircuit manufacturers.

Becoming a better customer is part of our thrust to foster better relations with industry and is a key element in our TQM strategy. Consistent with that philosophy, we have formed partnerships with industry and helped establish R&D consortia for essential industries. Extending this concept to production was recently endorsed by President Bush in his address to the National Association of Manufacturers. By pooling resources, consortia can accomplish tasks that would be prohibitively expensive or risky for an individual company. The DoD has been instrumental in supporting consortia for semiconductor manufacturing, machine tools and precision optics. The purpose of these consortia is to avoid potential foreign vulnerabilities by ensuring a domestic production base for important products.

With regard to foreign availability, Title III of the Defense Production Act, which provides manufacturers with incentives to establish or expand capacity for materials essential for defense systems, has proven to be a useful corrective measure. Typically, Title III projects involve advanced technology materials that lack a commercial market large enough to justify the risk of a private investment. Some of the projects established under Title III are silicon on sapphire wafers used for radiation hardened integrated circuits, high purity quartz yarn used for antenna windows and radomes, and high modulus pitch based yarn used for hypersonic vehicles.

In closing, I would like to emphasize that we believe there is no alternative to having an industrial base capable of supporting national security requirements. Having said that I should add that many of the problems of the industrial base are beyond the capacity of the DoD to solve. Education is just one example where we, as a nation, have to do better. Our trade deficit is another.

Again, I want to thank you for inviting me to be here and will be glad to answer any questions.

Senator BINGAMAN. Thank you very much.

Before we go to questions, I would call on Mr. Willoughby. But before I do that, let me ask Senator Lott if he has a statement that he wants to make at this time.

Senator LOTT. I don't believe so, Mr. Chairman. Thank you.

Senator BINGAMAN. All right, then.

Mr. Willoughby, why don't you go ahead with your testimony.

**STATEMENT OF WILLIS J. WILLOUGHBY, JR., OASN (RDA), DIRECTOR FOR PRODUCT INTEGRITY, U.S. NAVY**

Mr. WILLOUGHBY. Thank you, Mr. Chairman.

I would like to submit a copy of the statement that I have for the record and I would like to summarize with these vugraphs.

Senator BINGAMAN. We will include the entire statement for the record.

Mr. WILLOUGHBY. Thank you.

I have a series of viewgraphs that I am going to take you through very quickly.

[See prepared statement for viewgraph charts.]

This is a very unique chart in the fact that it is a real chart and it shows a real Navy with a real need.

If you examine that chart, you can see that readiness back in 1975, according to Navy assessments, was at about 30 percent. Our goal and objective by the year 2000 is to be up to the 75 percent readiness, which is a CNO objective.

We said we were going to cause the defense industry to produce this product in an economical and reliable way, and we said "by these means."

I just want to take a minute to explain to you what these means are and where we are today because it is very important.

Today we have, I think, established design and manufacturing criteria which produce a good product. I was transferred from NASA, to the Department of the Navy as you said earlier. But what you probably do not know is that I came not very much according to my will.

I had done an early survey, and Alan Shepard called me and said would you go over and look at a Navy product for us, which I did. I was asked what I thought of it, and I said that I didn't see how it worked at all.

Then, somehow, the word got around and the next thing I knew, I was working for the Navy.

So I probably went a little too far at that time.

At any rate, we have now established design and manufacturing criteria which works. We have employed it on all levels of products, as I will show you in just a minute.

We now have a system where we can conduct design reviews and know exactly what our product integrity looks like from a design point of view. We have guideline documents published. We are now developing textbooks and courses, which I will also discuss with you in just a minute. We are now in the area where we are trying to communicate this to industry, to strengthen our industrial ties, and to educate the general engineering community in the overall system.

Here are just a few examples.

This is a program, and if you will notice on the left-hand side of the ordinate there it says the number 10. In other words, that product was supposed to have been out in the fleet where the green line is up there, in terms of its ability to perform. And at that time, that was where its performance level was.

Where the "Xs" are is where we did our design reviews, reestablished how we manufactured the product, put it into being, and then, the next thing you know, it went up well above specification.

The same thing is true here in this next viewgraph. This is more challenging than the other one, only because this one is a lot harder job to do.

If you notice, down at the bottom of the curve, it shows some airplanes there. They represent somewhere around a 90 hour MTBF for the inertial navigation systems that were being made for those aircraft back in that timeframe.

In order for us on the F–18 to have a 2 hour airplane between failures, that particular inertial navigation system would have to have flown somewhere around 800 hours MTBF.

We went in, institutionalized the design procedures and the manufacturing processes, set it up in there—it happens to be Litton Industries - and Litton, with the same people and the same plant, were able to produce an INS that well exceeds the specifications.

This next graph is another example of just what happens when you get involved. I am a big advocate of let's find it all out in design, let's not look for it in tests, let's not look for it out in the field, but let's find out what is wrong in design.

These just show you some of the analytical tools that we brought over from NASA, put into being, and what can be found when you use those analytical tools.

Senator BINGAMAN. Now, the analytical tools that you are talking about are thermal analysis and what?

Mr. WILLOUGHBY. On the left-hand side—thermal analysis, FMECA/FTA analysis, dynamic analysis, sneak circuit analysis, stress analysis, worst case analysis, and finally stress analysis thermal.

In other words, when you apply those tools analytically, we found 333 things that had to be changed in the design, which normally would have been found in the field after delivery.

Senator BINGAMAN. Let me see if I understand.

The longest of those two-by-fours coming out of there is the one that you have labeled "stress analysis."

Mr. WILLOUGHBY. That's thermal, the green one up on the chart.

Senator BINGAMAN. Oh, the green one? Is that thermal analysis? Down here it says "stress analysis (thermal)." That's the one?

Mr. WILLOUGHBY. That's right.

Senator BINGAMAN. Now that means that most of the design improvements that you accomplished were done by virtue of that tool?

Mr. WILLOUGHBY. With that tool. Exactly right.

We had very little understanding of what thermal analysis really meant. It was not being used properly. It wasn't even good algorithms, as a matter of fact. But we brought it all over from NASA and implemented it. That's all.

Senator BINGAMAN. Okay.

Who is the contractor on this radio?

Mr. WILLOUGHBY. That was Collins, Rockwell—Rockwell International, Collins Radio.

Senator BINGAMAN. Okay.

Mr. WILLOUGHBY. This next chart is an example of something that gives us a lot of headaches. This is a power supply called a BQQ–5, a low voltage power supply (indicating). It is in our system of the BQQ–5 sonar. There are 104 of those in the system and they were just, you know, working at such low reliability that the whole system was being brought down.

We did a survey of the fleet and found out that 20 to 30 percent of our problem out there was discrete switching power supplies.

Senator BINGAMAN. Excuse me, but I could not understand you.

Mr. WILLOUGHBY. That was discrete switching power supplies. That is the name of that.

Here is an example of them right here (indicating.) This one (indicating) is the before; this (indicating) is the after. This is a very good example of what happens when you go in and how you can change the process. You see what happened when we did that. Now our MTBF goes up well above 200,000 hours, whereas before, we were very fortunate if we could even get 13,000 to maybe 50,000.

Now, 100,000 hours had to be the minimum of that system if it was going to work right. So we went in and did the analysis.

This is a good example if anybody wants to look at it. It really shows you what you can really do.

When you are finally finished, our goal, as you saw on the first chart up there, was to improve the fleet by 45 percent. That was my challenge. That is what I was given by Admiral Ike Kidd who was then the Chief of Naval Materials.

I said that what I had to do was to get the fleet up by 45 percent.

What we are telling you in this next chart is that we almost made it. We lacked 10 percent of having the fleet where we wanted it.

You can see it on the first chart, where it was a dotted line.

Senator BINGAMAN. Now, when you say to improve overall fleet readiness by 45 percent——

Mr. WILLOUGHBY. That's right.

Senator BINGAMAN [continuing]. That means in the equipment being used by the fleet?

Mr. WILLOUGHBY. By the fleet.

Their assessment was they were at about 30 percent readiness. That is the reason I was called over from NASA. They were trying to keep the fleet in a readiness state by logistics, and logistics was just too hard. There were too many parts needed and you weren't certain of which parts you had to have.

When we looked at it, the design issue was really the problem. We just did not have good designs. It was that simple. So, we went to work doing exactly that.

We reviewed every piece of equipment in the fleet today, almost without exception. It has all been through our office for review. We gave it our stamp of approval which meant that the design was good and that the manufacturing process was right.

That is how we manage that.

The message in that chart really is that we had a lot of things to overcome, we've done it, and we list it. But, there is still 10 percent to be done. That is the next chart.

These are the issues that I want to put before you today.

The 10 percent that is left is going to be the hardest part. It took us this long to get this far (indicating). But the last 10 percent, that part of the curve, is going to be very hard to reach, and because of these things.

Our Nation, in general, does not tend to strive very much for anything but mediocrity. We have a very hard time dealing with issues much above the national norm. Front-end funding is still very much at issue in the whole budget process, and you cannot put too much money in the front end, in my opinion.

Realistic requirements—we are still trying to define those issues, put the right bounds on them, and formalize the methods and standards by which we do it. Finally, involved in the budget process in what I call a realistic way—trying to tell them from the very beginning.

Senator LOTT. Mr. Willoughby, you said that a large percentage of the problem was purely and simply design.

Mr. WILLOUGHBY. Yes.

Senator LOTT. Give us an example of what you are talking about.

Mr. WILLOUGHBY. Well, the BQQ–5, I will use that, and it is this right here. You can look at it.

This is the power supply from it.

Senator LOTT. The power supply for what?

Mr. WILLOUGHBY. For the BQQ–5 sonar. That is a Navy sonar. It goes on our submarines and ships.

This device (indicating)—now I want to be very careful here. There were parts in this device which were highly over-stressed. One of the issues of a component's life is how much stress it is under. If you are under too much stress, you know, you don't function very well, and if I am under too much stress it's the same thing.

These parts have very unique stress characteristics. If you violate those stress characteristics, they will fail early.

We were not paying attention to the stress analysis. For instance, there is a voltage stress, and we should always have the right voltages on the components, although they do allow you a band width on which you can have the electrical values.

But, what we have done is derate it. We have set all capacitors, for instance, to have their working voltage derated by 50 percent.

This is common in the commercial world. The commercial world has been doing that for years.

So, if you look inside of here (indicating), the other part of it is we had very poor thermal analysis. The parts were not properly placed so their heat could not be conducted off adequately, and they would overheat and burn up.

Those are just a couple of examples. There are more than that. There is a whole family of things in here, but I was just trying to summarize it for you in an easy way.

Those things that we talked about earlier, the analytical tools that we use, those are the ones which are used to show you the condition of your design prior to manufacturing. If you have not

done all of those things, you are likely to run a risk and the risk could be trouble.

Now, these are things that we encountered in the early days.

What I want to point out to you is the world of design has made good progress. What we are looking at here are things which have to do with people, how we motivate them, how we get them to do the job right the first time, and other things like that—which are very, very hard to do.

Senator BINGAMAN. To make up that 10 percent?

Mr. WILLOUGHBY. To make up that 10 percent, yes. That is the column we are looking at, right there (indicating). I call it the hardest part. To me, the rest was easy. We had to write the criteria, set the procedures, put the manufacturing facilities with the right investments, et cetera. Now people is our issue.

I think, following me, you are going to hear a good bit about people in programs such as TQM (Total Quality Management) which is an integral part of motivation.

This next graph is a summary result of what happened on the 1 year task force when I chaired the Defense Science Board (DSB) which looked at an area called "Transition from Development to Production." In other words, we can design it pretty well, but for some reason, when it comes to switching from the drawing board to the manufacturing floor, we tend to stumble.

Identified here were 47 areas. Each one of those boxes represents one process or one area that the Defense Science Board found was hard to manage, gave us trouble, and in many cases was the reason why the hardware was not developed properly.

So, we identified those 47 areas and put them into a document called DOD 4245.7-M. This Department of Defense manual specifies that programs have to use this kind of risk assessment in identifying hardware, its design, and its qualifications.

That is in this particular document right here.

Senator BINGAMAN. Is that a Navy document or DOD?

Mr. WILLOUGHBY. That's a DOD document, the Department of Defense.

Senator BINGAMAN. All right.

Mr. WILLOUGHBY. Now, we use it more heavily, although I think the other services are beginning to use it more and more as they begin to see what is in it. We use it, naturally, because we helped to develop it.

If you look at what is happening on this next viewgraph in that template area, what we have done with those 47 templates so far—and this is kind of a summary of it, I just wanted to let you see what is happening—in the 10 years that we have been working this area.

We came to a point in 10 years where we really had—and I just want to summarize that chart—where we really had no corporate commitment to this reliability/quality area. They talked about it, but there was really no corporate commitment.

In that period of time, we have seen corporations actually write their procedures for their design and manufacturing around this particular document.

Many of our companies today use this as their corporate procedures because it does delineate how you do the job.

Senator BINGAMAN. Many of the contractors that do business with the Navy?

Mr. WILLOUGHBY. The contracts, with the Navy, the Army and the Air Force.

Senator BINGAMAN. Use that document?

Mr. WILLOUGHBY. Use that as their basic corporate policy.

Raytheon is a good example. Raytheon has just organized completely around it. They are totally committed to risk management.

The major issue in the Government is that we rarely recognized what to put in the contract that we really needed in order to get the product in the first place. Few of the contracts had the right language in them. That now has basically been changed.

None of the material I'm presenting to you indicates that we don't have problems. What it does show is that we have come a long way up that curve. We have a fleet out there today which I think is very capable. I think the Navy's Mediterranean exercises over the past few years support this conclusion. Our involvement in Tripoli is further evidence of the Navy's improved readiness. We could not have operated in that environment, in my personal opinion, with the readiness we had in the early days when I first came from NASA. I think we would have had an altogether different picture with the equipment reliability we had then.

We have come a long way, and I think we have reached the point where we can say that the problem has been defined and we know what to do to fix it.

This next viewgraph is the remaining issue.

What it shows, in essence, is that I feel the thing we must do now is educate. What I found in looking at this whole period of time—and I have been with the Navy now for about 15 years, which is a lot longer than I had planned to be there—what I found is that, basically, we need education. Our people come into the Navy off the street. They have no design experience. They have never been in a drawing room. They come right out of college, street level entry. They have never been in a manufacturer's facility.

And, of course, our military never has either. So their experience level is not very high in this area.

What we have decided to do is educate them.

This is a course outline of what we intend to do, over what time period, and how we intend to get it done.

I hired Bell Labs. Bell Labs used to work for us on Apollo, and I know most of the employees. Every time I get into trouble, I run to them.

So, I ran to Bell Labs and asked what can we do to get text books in all of these areas. I did a survey and found there were no textbooks, none whatsoever. This is all on-the-job training. You just learn it when you come up through the ranks like I did, through the design and manufacturing cycle.

So, we have hired Bell. What I have here is a very impressive stack of books, 16 of which are on hand now to assist with design instruction for various areas of the 47 templates.

Bell will deliver 16 more by the end of the summer. By year's end, we'll have the remaining templates. We have a flyer that we

are going to send to all of our industry and government people announcing when and where instructional courses will be offered.

That is what I call the final cap on this effort. It is to see now if we can educate.

I would like to enlist your support, as well as others, in this whole area that education is really where we ought to be focusing right now in the areas of design and manufacturing.

Our universities do not graduate the type of people we need. I realize that what I was doing was reeducating the people who had graduated from school.

I found out in 1957, for instance, that ABET no longer requires them to teach in the area of design and manufacturing.

Senator BINGAMAN. Who does not?

Mr. WILLOUGHBY. ABET, the Accrediting Board for Engineering Technology, who accredits all of our universities.

I was told that in 1957 ABET dropped all requirements for design and manufacturing. All universities are required to teach in the field of engineering today is theory and fundamentals.

Theory and fundamentals are not enough to develop a product. We need more education on how a product looks and how you design and manufacture it. That is the reason the Japanese have made so much progress. They are product oriented.

We seem to be theory and analysis oriented and not product oriented. That is a problem that our Nation faces today. We have lost the product thrust.

Now, I believe this has a lot of implication in industry. We have had calls from Caterpillar Tractor, even from Walt Disney, to receive some copies of this documentation.

I think we are on the verge of having something that not only has done something for the Navy, but can do something all across this country of ours, if we can get all of this out and articulate it right.

This, to me, is the big, pressing issue, and it is kind of the thing I really wanted to leave before you today.

We have a fleet that I am satisfied with. It is not perfect, but it is a long way from where it was, and I think it can do the job.

Next slide, please.

Now, let me make some observations which I think are important. They may be somewhat controversial, but are still true.

This is the only professional business enterprise in the world where experience is not a prerequisite of program management. It is kind of like sending me into the operating room and letting me operate and do brain surgery just because I read a book called "Brain Surgery 101." It does not work that way.

You have to have experience. You have to have been on the drawing board. You have to have been on the manufacturing floor.

In the military, we have very little experience in this area. They come out of the fleet, they come out of the Air Force, they come out of the Army, wherever they come from, and they have high IQs, but the experience is missing.

Senator BINGAMAN. You're saying that the people we put in charge of overseeing the programs——

Mr. WILLOUGHBY. Have little experience.

Senator BINGAMAN [continuing]. Have no professional experience in this area?

Mr. WILLOUGHBY. In this area. That is exactly right. And yet, we expect them to do a good job.

Now, believe you me, I am not putting them down in the least. They do admirably, when you really consider the handicap that they have been put under.

So what we are trying to do with this educational program is bring that experience in. I believe you will see that change. That will go away shortly. I would predict within a year to a year and a half from now, if this program is put out like we plan for it to be put out you will see the whole experience issue drop.

At any rate, there is a constant learning curve, and that is what it is from. We bring them in and they learn, and by the time they learn, it's time to go back out into the fleet again. Then we bring another one in, he learns, and then it's about time for him to go out in the fleet again. So we have this constant learning curve that is taking place.

Senator BINGAMAN. And that's not going to change in the next year and a half, is it?

Mr. WILLOUGHBY. Well, it will when you incorporate an education program. Yes.

Senator BINGAMAN. But then we will be educating them, keeping them in, and turning them out.

Mr. WILLOUGHBY. And using them in the right way. They will come in with a higher level of experience.

Senator BINGAMAN. Right. But they still won't stay.

Mr. WILLOUGHBY. They still won't stay, no. I don't have anything to do with how long they stay.

Senator BINGAMAN. You can't solve that.

Mr. WILLOUGHBY. I don't solve that and don't even try to solve it. My job is to see if I can get them at the level where they really feel comfortable in what they are doing. That is what I am working on. And, you know, where learning is not a central requirement, that is what we are changing. We are now going to put an education block in. The Navy is supporting it and I believe all the other services will be behind it very quickly.

And, finally, you see that product is subordinate to administrative activities and the news media has a field day.

So that is kind of where we found ourselves.

Next slide, please.

What are the solutions?

Increase the knowledge of the design and manufacturing process by several areas. First is educational, and we have just talked about that. Bell Labs has developed textbooks which we are putting on campuses. We also need to expand the vision of total quality management.

You hear a lot today of the letters TQM. I think TQM can have a much larger vision than it has. My personal opinion is that what they are doing is okay, but it can be a lot better. We can add this (indicating) into their vision. We can put a lot of the things we're doing into the whole vision of TQM and not only will it be people oriented, it will be product oriented. It will be product oriented, and it will have a much broader scope than it currently has.

If it were up to me, I would eliminate the priority on military specifications. I would tell the program manager he doesn't have to use them if he doesn't want to; if industry has a better specification, let him use theirs. That would end the specification debate which has a lot going on, whether it is good, bad, or otherwise.

Right now, a program manager has to use military specifications whether he wants to or not.

Senator BINGAMAN. Is that in the statute?

Mr. WILLOUGHBY. I couldn't tell you that. All I know is that is just kind of the way it is.

It seems to me, I think if we made some clear statements that they don't have to use them if they can find industry substitutes, which, in their opinion, or in somebody else's opinion, are equal to or better than those, then I think we would be a lot better off. That is a personal opinion, and just my observation.

I am not a great fan of military specifications.

Finally, there is injection of a material readiness into the decisionmaking process.

The last bullet is the one I am really sort of pleased to be here today for. I think we need to talk more with you all and others in the Congress on a nonprogram basis about just what have we learned, what do we know, what are the things we think we do best, how can they be interjected even into the American public, how do they get into the American commercial sector, and so on and so forth. I do not have many opportunities to do this, but I think this is a good one. So I was taking a chance.

Finally, in this viewgraph, my continuing concerns. These are better technical interface—we said that. Low cost mentality—we have gone a long way in competition, but it has been interpreted as "low cost only." I think we have seen some of the problems that has produced. I am not against competition in the least, but I think what we have to watch is the "low cost mentality" that seems to come into it, where we buy low cost only. It gives us a lot of problems when we do that.

"Low cost" is not necessarily your best buy. In some cases, it may be, but you have to look at it very carefully to see whether you are just buying low cost or you are really getting a good product for the low cost.

Then there are conflicting requirements, which I think are still around. One that I would hold up for you today is this. In industry, if you want to do business right, you automatically set out with multi-year procurements. You set the timing with your vendors so that you can buy 3 or 4 years in advance. That allows them to improve the quality and lower the cost.

I can see the effect of not having multi-year procurement as an every-day way of doing business. We have to allow our industry to reach out and buy over long buying periods from their vendors what they need and establish a baseline by which they can get improved quality and lower the cost over that period of time.

Industry does that fairly routinely. But the Department of Defense seems to have a hard time doing that.

Senator LOTT. Which one of those are you referring to—the low cost mentality or conflicting requirements?

Mr. WILLOUGHBY. Conflicting requirements.

Senator LOTT. I got a bit distracted for a moment. Would you speak again about the low cost mentality?

Mr. WILLOUGHBY. Well, the low cost is where it is being interpreted as "only low cost." In other words, there is a big move for competition. I do not necessarily see anything wrong with competition. But when it gets interpreted as "low cost only," then we have a problem because we are not getting best value. We are just simply getting low cost. I have seen products that I think fall into that category, where they are just low cost. I think we have to be careful of that.

We want to always say we want best value as well as low cost.

The industry will tend to respond by just giving you the lowest costs they can. You have seen a lot of it in the newspapers, I'm sure, with our "Beltway Bandits" and the people who provide support, who are down to $7 an hour for engineers. You know, that is getting pretty low. I don't know what you could get for a $7 engineer. I really don't.

But that is the way some of this low cost attitude has taken us. We are in that kind of world.

Next chart, please.

Let me talk briefly about the MANTECH, about which you have already heard some. I just want to tell you that the way we have done it, which follows what has been said, is that we do have the manufacturing technology program. But what we have interjected in here, which I think is very promising, is something called Manufacturing Centers of Excellence. That is one that I will spend a few minutes on with you, because of its involvement with the States.

I find that the States are very interested in this, and so, what we are having is a great deal of success in that area. We also have a program called "Best Manufacturing Practices," where we simply go out in industry and, instead of auditing them for what they do wrong, we ask them what do they do best.

We have a list of companies we have surveyed and found out what they know best. We then put these companies together and they share it all.

This next viewgraph just tells the benefits you get out of manufacturing technology. This is just our history on it. I am sure there are others that have even different histories. But there are a lot of benefits in it.

This next viewgraph is what I want to focus on for a minute.

We now have four centers. We have the Advanced Manufacturing Research Facility at Gaithersburg, under the old Bureau of Standards. We have the Electronics Manufacturing Facility that we are now moving to Indianapolis, Indiana, in a consortium there with the State, in which the universities are going to get involved. We have the Center of Excellence, which is at Johnstown, on metalworking. And, we have a composite facility that we now have out for bid, which we are evaluating to see who is going to get it.

What I like about this is that the centers are in States, and States care. States are beginning to look at their technology base. I think it is a good place for us to interact with the technology, give them an opportunity to see the technology, and bring it into the commercial world.

I am a person who is oriented to the commercial world. I think everything in the Department of Defense somehow ought to make its way into the commercial world, where practical.

Those are really our show pieces. They work well. We are very proud of them, and we are going to introduce some more of them here very shortly.

This last slide is something that simply says funding for MANTECH has always been unstable. That is all this chart says.

We have a very difficult time managing our MANTECH programs. I spend more time, proportionately, on MANTECH than I do on anything else, just trying to manage the budget, because of the way it seems to come in and then disappear. People interject programs into it, tell us to do things on top of what we are already doing.

One of the things you all could help on, greatly, you know, is if we could find some way to stabilize the money base, where we would not have to keep moving programs, canceling programs, et cetera, in order to accomplish it.

Thank you very much. That is all I have by way of summary.

[The statement of Mr. Willoughby follows:]

# NAVY PRODUCT INTEGRITY AND INDUSTRIAL PREPAREDNESS

**W. J. Willoughby, Jr.**
**OASN(RDA)**

## SECTION 1

## DESIGN & MANUFACTURING... WHAT THEY MEAN TO FLEET READINESS

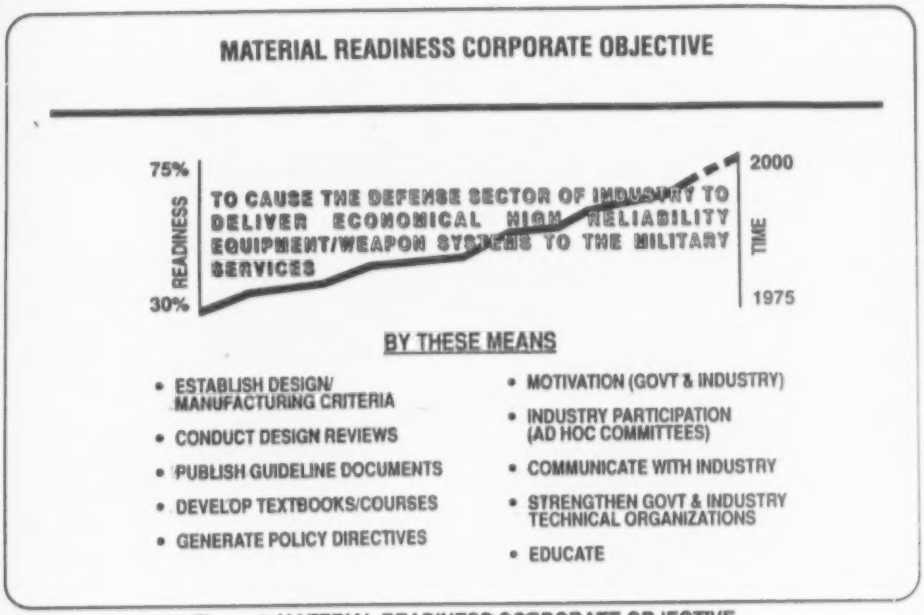



Figure 1. MATERIAL READINESS CORPORATE OBJECTIVE

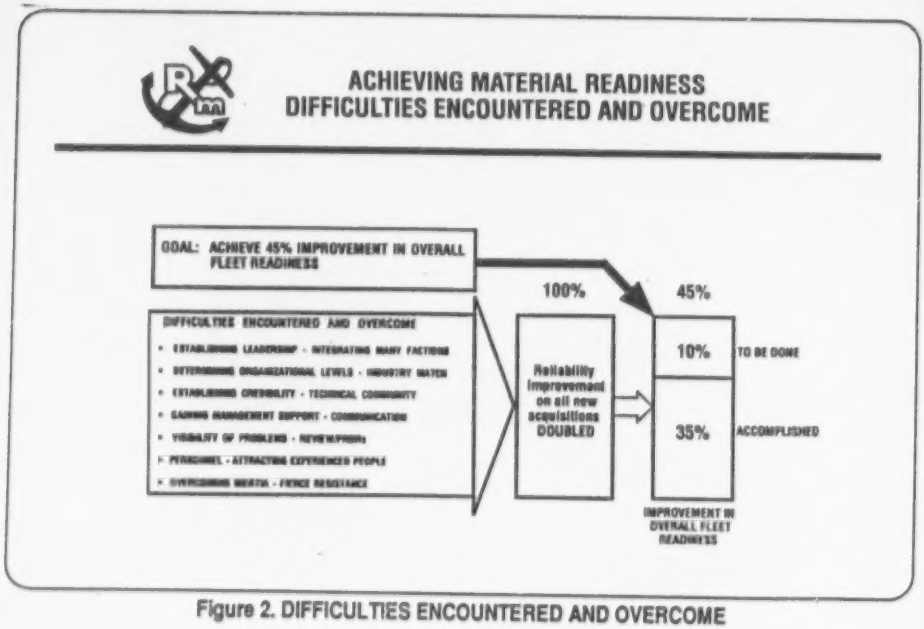



Figure 2. DIFFICULTIES ENCOUNTERED AND OVERCOME

## DESIGN & MANUFACTURING... WHAT THEY MEAN TO FLEET READINESS

W. J. Willoughby, Jr.
OASN(RDA)

Prepared for the Senate Armed Services Committee,
Subcommittee on Defense Industry and Technology

### INTRODUCTION

Weapon systems that do what they're supposed to do, when they're supposed to do it, have always been a fundamental concern of the Department of Defense. A primary purpose of weapon system test and evaluation is achieving and verifying both the "what" (performance) and the "when" (reliability). In an environment of escalating complexity in both technology and world affairs, performance has kept up with—and in some cases, influenced—the relationships between nations. As much cannot be said for reliability. As our Nation entered the 1970s, our military material acquisition and support communities were strewn with the carcasses of unreliable weapon systems resulting from ineffective military requirements.

Over the last fifteen years, the Services have been correcting this situation through an enlightened approach to designing and manufacturing weapon systems. Figure 1 shows what the Navy set out to do, how we planned to do it, and roughly where we are today. Our goal was to increase fleet readiness to at least 75% by the year 2000, a 45% improvement over the situation we inherited in 1975.

As we strived to achieve this goal, we have encountered and eventually overcome a number of difficulties. Figure 2 identifies the major hurdles, and notes that we are still about 10% away from our goal.

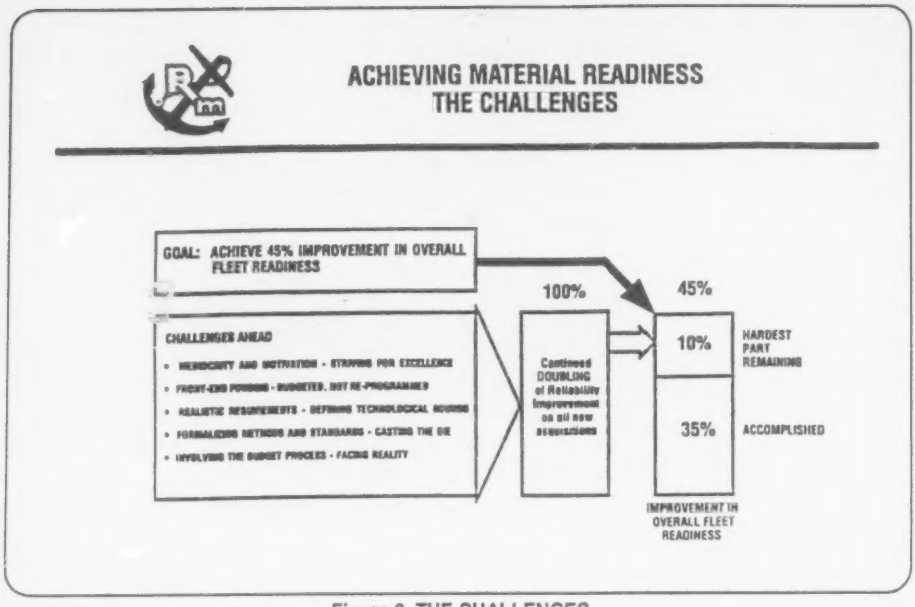



Figure 3. THE CHALLENGES

The challenges we see before us have been with us from the beginning, but we must now deal with them to achieve the last 10% of our goal—the hardest part. These challenges are summarized in Figure 3, and concern the larger issues over which we have less control, as well as the task of institutionalizing what we have accomplished to ensure that progress will continue when we are gone. We are also striving to ensure that reliability improvement on new programs will be at least double the achievements on like programs of the past.

## RELIABILITY BY CHANCE: Where We Began

In the early 1970s, the Navy had become concerned that the low operational readiness of its sophisticated weapon systems was seriously compromising its mission. It was doubtful that systems could be maintained in combat when battle damage was incurred and supply pipelines were strained or cut. The high rate of equipment failure required too many spare parts, and the reliability of some systems was so low that maintenance could not achieve an acceptable level of readiness, even in peacetime. The maintenance overload was worsened by the continuing difficulty in recruiting, training and retaining the specialists for increasingly complex systems. The cost of parts and man-hours, aggravated by inflation, was taking its toll on the operations and maintenance budget.

Relatively simple weapon systems had been produced in the 1940s. As complexity increased and design margins decreased in the 1950s and 1960s, reliability began to suffer, taking a back seat to performance and cost. Paradoxically, satellites and manned space vehicles spawned a new approach to reliability during this same period. By the early 1970s, the U. S. Navy was ready to turn to the successful manned space program for new ideas to make weapon systems reliable.

You should be aware of the approach to reliability being taken prior to 1975 and which is still around in some military programs today. Emphasis was on minimiz-

ing the statistical probability of failure—thus "reliability by chance." The old approach (1) specified a numerical probability of mission accomplishment; (2) required a formal demonstration test to assure its attainment; and (3) called for a reliability program "in accordance with MIL-STD-785." The specific content and degree of that program were largely at contractor discretion. Granted that this is a generalization to which there are many exceptions in specific procurements, it nevertheless typifies the older approach. Blind reliance on military specifications and standards was a simple approach to implement contractually.

The Services relied on the reliability demonstration test ("rel demo") as a sufficient incentive for a reliable and maintainable product. In order for the rel demo to have any significance at all, it had to test hardware as near to the production configuration as possible. This usually meant that at the time of the test, the design effort was essentially completed, the design was frozen and pre-production prototype hardware had been fabricated, using "soft" tooling. Corrective action for any failure due to design deficiencies at this point would be so expensive that often only the most serious flaws were corrected.

To compound this problem, rel demos were seldom conducted under functional and environmental conditions representative of operational service use. For example, electronic systems were usually subjected to the benign test environment of MIL-STD-781B. Reviews of many programs concluded that insofar as reliability was concerned, contractors often permitted demonstration tests, instead of the expected service environment, to drive their designs for reliability. Test failure classification rules defining "relevant" failures, invoked by failure review boards and lawyers, often contributed to exaggerated statements of achieved reliability. As a result, some failures went uncorrected even in rel demo, and recurred frequently in service.

Reliability was also being lost on the factory floor. Even well-designed hardware often failed in service as a result of faulty parts and workmanship.

For example, up to 15% of semiconductors procured to such specifications as MIL-STD-883 and MIL-M-38510 were found to have been faulty prior to use. Visibility of manufacturing defects was by means of trends, which provided no assurance of the condition of individual end items. Ineffective screening at higher levels of assembly allowed many defects to escape the factory. Production testing was often inadequate to stimulate infant mortality defects for correction prior to acceptance. Manufacturing defects in such things as solder joints, cable-harness assemblies and PC boards escaped the factory too often.

Whether we agree or not, reliability engineering in both the government and industry was not an enviable job. These people enjoyed little professional respect among their peers in engineering. Long-standing emphasis on reliability by chance had resulted in a typical reliability engineer being more a statistician than a technically savvy designer. Moreover, quality assurance in the government was viewed as no more than an inspection function under the wing of defense contract administration services. Like reliability, emphasis was on measuring quality, not directly influencing it, and least of all through design. Engineering and manufacturing viewed with some disdain the activities of the other.

## RELIABILITY BY DESIGN: The Navy Years

Efforts began early in the 1970s to understand and evaluate the shortcomings of reliability and quality assurance policies and practices in Navy material acquisition

programs. From the vantage point of experience in the manned space program, identifying these shortcomings was like "shooting fish in a barrel." Corrective action was another matter, given the competitive defense acquisition environment, budget constraints, political influence, program manager turnover, sheer size of the uniformed military establishment, bureaucracy, and even tradition.

Undaunted by the seemingly insurmountable obstacles, early and pragmatic action involved manned-space-oriented review of individual programs, and redirection where necessary to correct the most flagrant problems. In the absence of an infrastructure of appropriate military directives, instructions, specifications and standards to replace the existing faulty ones, this seat-of-the-pants approach worked only because program approval authority was delegated to highly experienced senior engineers transferred from NASA's Apollo manned space program to top Navy management, short-circuiting the bureaucracy. It was a risky decision for the Navy but it was successful.

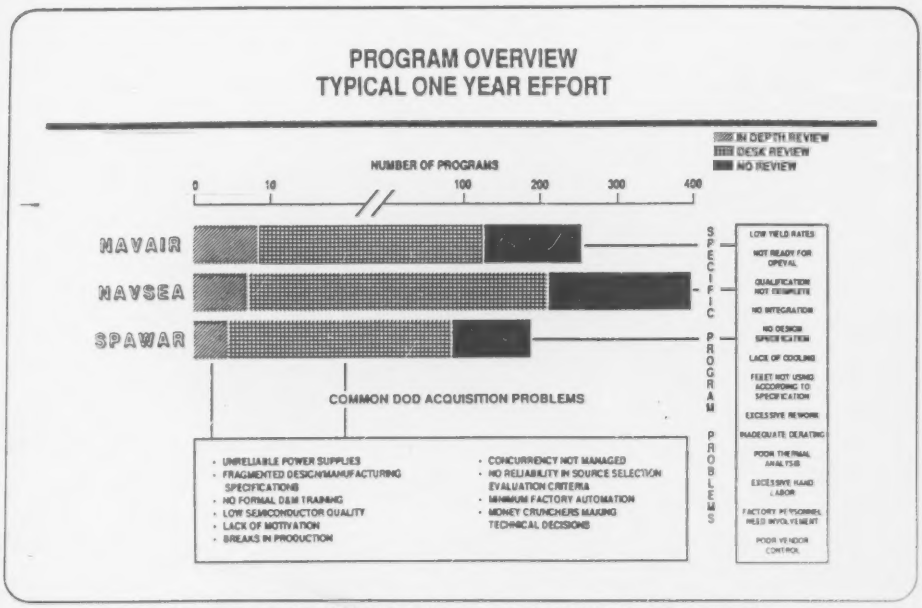



Figure 4. PROGRAM OVERVIEW—TYPICAL ONE YEAR EFFORT

Program review activity since 1975 involved over 200 major Navy contractors and about 1000 of their major vendors. As shown in Figure 4, in a typical year, in-plant reviews of 20 major Navy weapon system acquisition programs were undertaken. While these represented only about 2% of the active Navy programs, they accounted for a much larger percentage of acquisition dollars. At the same time, the acquisition documents and progress reports of many more active programs were reviewed. Through this program review activity, the Navy acquired a great deal of insight into the government relationships and industrial operations which have a direct impact on both productivity and quality.

On the other hand, lack of training programs and written materials to support them severely impeded efforts to "institutionalize" enlightened approaches to reliability and quality assurance. In retrospect, this may have been fortuitous, in that time was needed to investigate and understand existing problems and their causes

in the military environment. The bureaucracy also needed time to accept and implement the changes. More rapid attempts to effect change might have met far more resistance.

The changes were directed at shifting emphasis from statistics to engineering; from measuring reliability to building it in. At the risk of oversimplification, this approach can be said to focus on (1) designing to reduce stress, (2) testing to simulated mission operational conditions in order to find design flaws, (3) building to print in the factory, and (4) stressing the product to stimulate manufacturing defects prior to shipping. Throughout the 1970s and 1980s, this focus has never wavered. Using a variety of slogans such as "Reliability By Design, Not By Chance," "R&M 2000," "The Transition From Development To Production," and "Best Practices," the Services have gradually swung contractual and program management attention away from the mathematics of reliability and quality assurance to the engineering design practices and manufacturing processes which truly lessen risk.

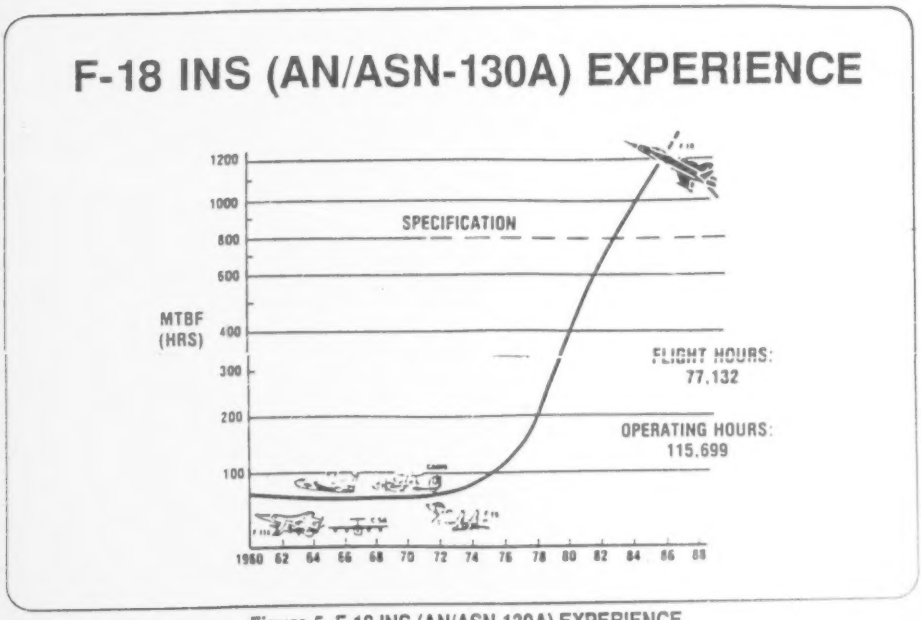



Figure 5. F-18 INS (AN/ASN-130A) EXPERIENCE

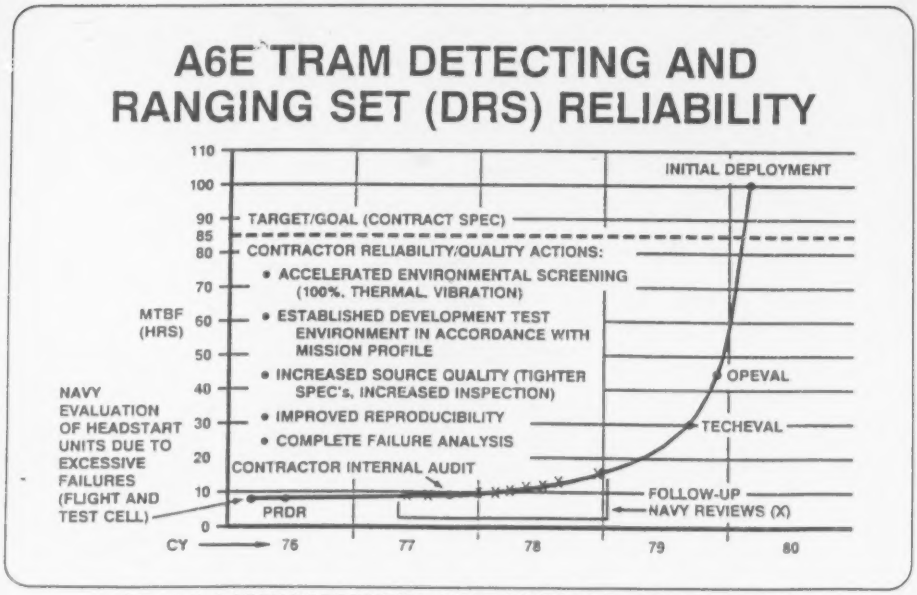



Figure 6. A-6E TRAM DETECTION AND RANGING SET (DRS) RELIABILITY

**Design**

Oriented towards widening design margins by reducing stress, or by increasing system tolerance to stress, engineering for reliability requires design simplicity; stress analysis and conservative derating policies; parts and materials qualification and acceptance testing; failure modes and effects analysis; and certain other engineering fundamentals. The AN/ASN-130 Inertial Navigation System is a good example of applying these fundamentals during the development phase. This system demonstrated an early improvement of about six times the reliability of any previous INS, and is now well above its specification, as shown in Figure 5.

Figure 6 illustrates similar results on the A-6E TRAM Detection & Ranging Set.

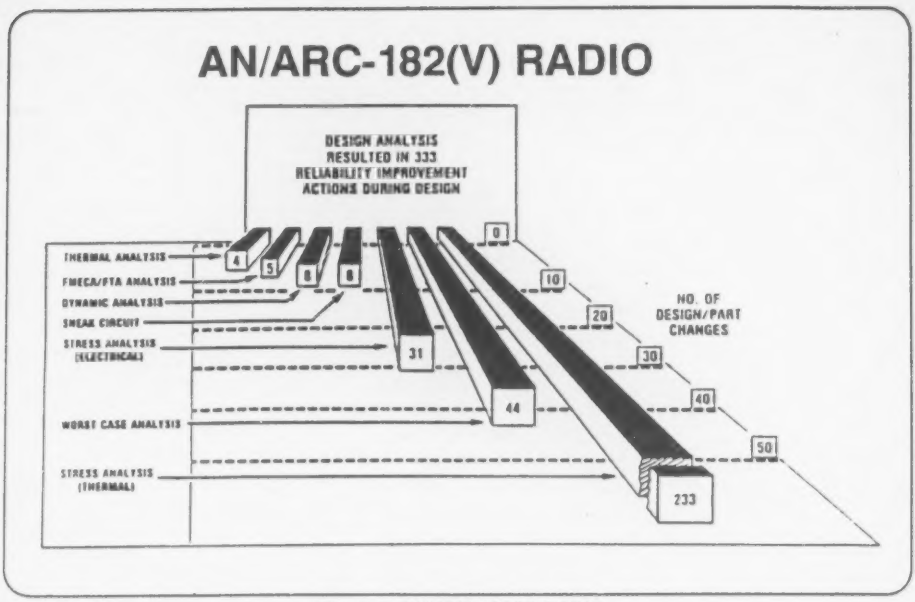



Figure 7. AN/ARC-182(V) RADIO

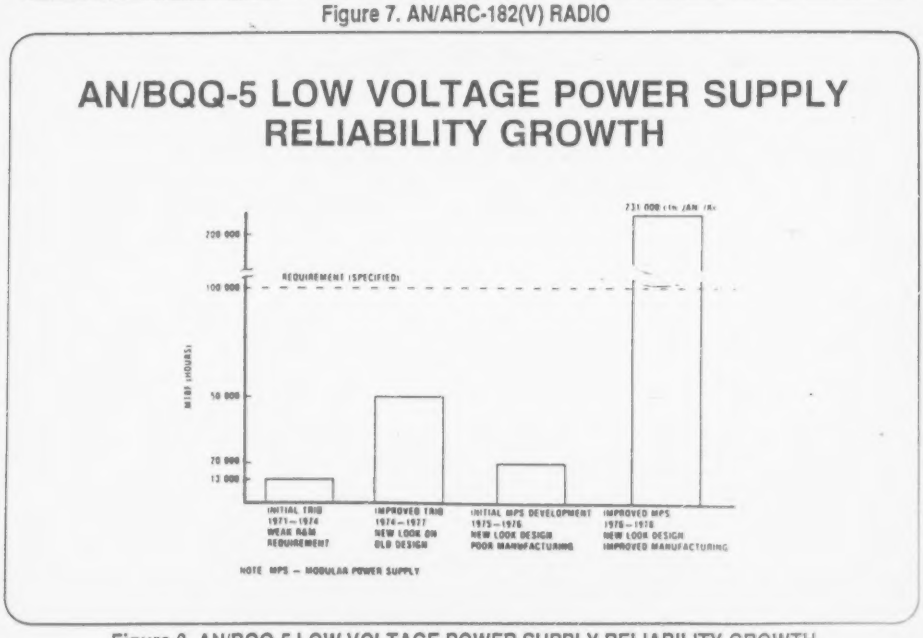



Figure 8. AN/BQQ-5 LOW VOLTAGE POWER SUPPLY RELIABILITY GROWTH

Figure 7 summarizes the reliability improvement actions resulting from the application of these design fundamentals to the AN/ARC-182(V) radio.

Figure 8 illustrates similar results on the AN/BQQ-5 Sonar power supplies, but also reflects substantial improvements in the production processes used to manufacture it. Because there are some 100 of these power supplies in each sonar system, the result was a significant improvement in the overall system reliability.

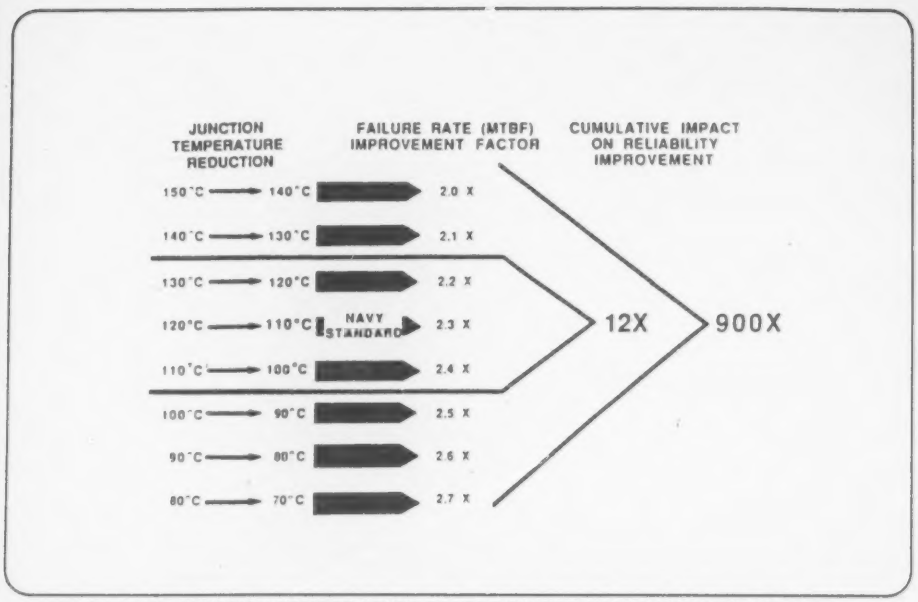



Figure 9. JUNCTION TEMPERATURE EFFECT ON SEMICONDUCTOR RELIABILITY

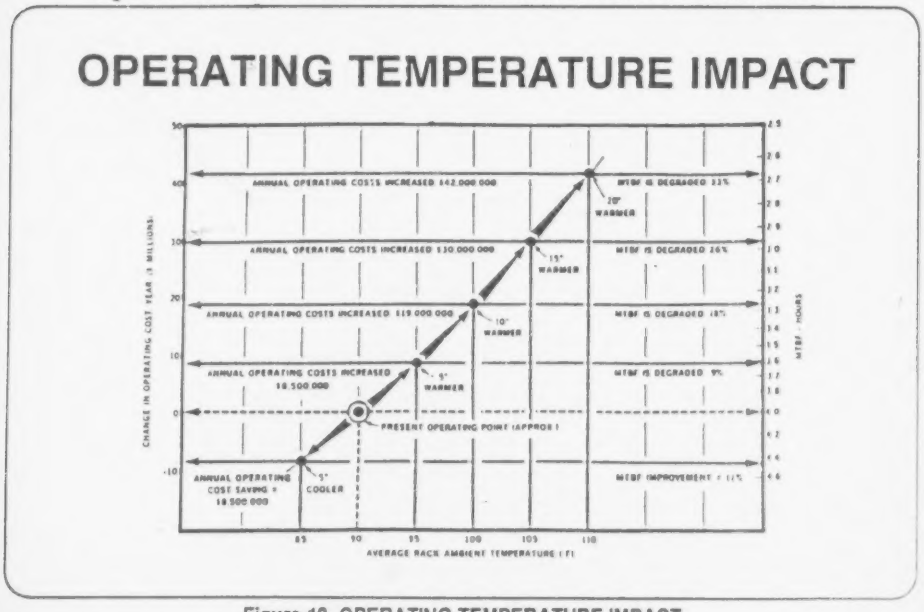



Figure 10. OPERATING TEMPERATURE IMPACT

The high risk stresses for each class of component parts are well known. For example, the reliability of semiconductors is very sensitive to junction temperature as illustrated in Figure 9.

On the basis of industry experience as to what constitutes conservative limits on junction temperature, the Navy set an upper limit of 110°C on this parameter. As an example of this sensitivity to heat, lowering the cabinet temperature of selected electronic equipment on 200 aircraft by 20°F was shown to double the equipment Mean Time Between Failures and offered a savings of $42 million in the first year of operation, as shown in Figure 10.

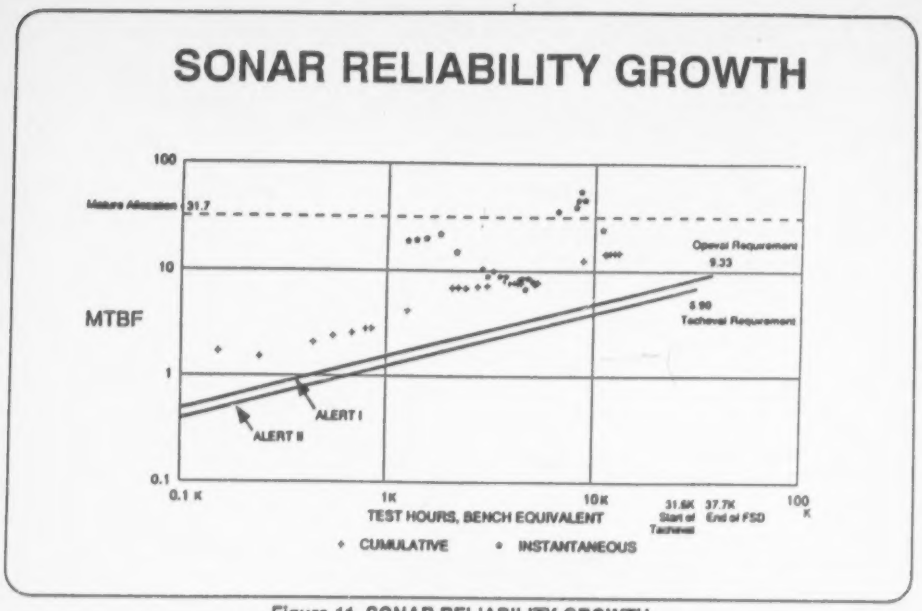



Figure 11. SONAR RELIABILITY GROWTH

The Navy began discouraging reliability demonstration testing in favor of reliability development testing, sometimes known as "test, analyze, and fix" (TAAF). TAAF is conducted under environmental conditions which simulate the mission profile. During the development test program, all failures are required to be investigated to the extent necessary to understand their causes. Corrective actions, design or otherwise, are taken prior to design freeze to minimize the possibility of failure recurrence. Continuing failure analysis and corrective action are encouraged until reliability requirements are satisfied in the field, although contractor responsibility for correction of field failures is often thwarted by inadequate field failure feedback mechanisms and procedures.

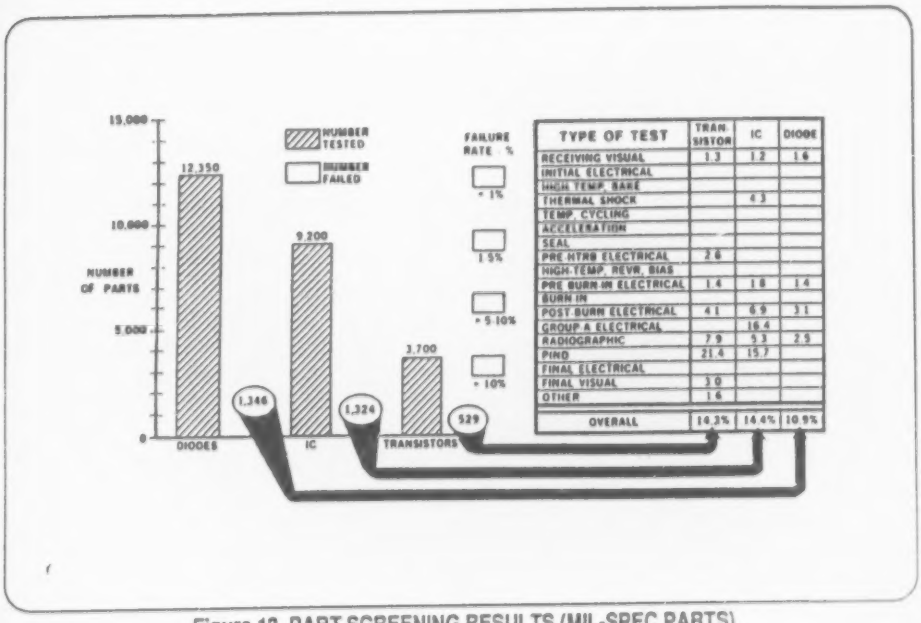
Figure 11 shows the TAAF results on a torpedo sonar subsystem. A dedicated system was fabricated for TAAF, and worst case environmental conditions and duty cycling were used. The two alert lines were drawn at a slope of 0.5 and mark thresholds for management attention. The actual test results lie well above these lines, roughly at the same slope. The instantaneous values were based on the five most recent failures at each point. As a result of this TAAF program, the final in-water qualification test program was almost error-free, and reliability is no longer a risk factor in this program.

Qualification testing to measure system performance at mission environmental design limits has been standard procedure for many years. Such testing, however, is usually too short in duration to support any statement concerning achieved numerical reliability. An added feature of the TAAF concept, if rigorously pursued, is the ability to predict the achieved numerical reliability level. While not as statistically valid as a dedicated demonstration test, this prediction is far more cost-effective and timely. Demonstration testing is reserved for those programs in which there is no other agreeable means to verify contractual compliance.

## Production

Attention to design stress and reliability development testing early in the design process can produce reliable designs, but this is not enough. Unless the designs are built to print in the factory, the material will continue to cause trouble in service. "Built to print" means no workmanship defects and no faulty parts.

Manufacturing screening has proven very effective in discovering workmanship/assembly defects and it can improve manufacturing efficiency by reducing costs when corrective action is implemented. The Services began emphasizing such screening, requiring a short period of high-level (6g RMS) random vibration and a series of thermal cycles consisting of fast ramps and short dwell times. Screening time is minimized while at the same time maximizing the effectiveness of fault detection.




| TYPE OF TEST | TRANSISTOR | IC | DIODE |
|---|---|---|---|
| RECEIVING VISUAL | 1.3 | 1.2 | 1.6 |
| INITIAL ELECTRICAL | | | |
| HIGH TEMP. BAKE | | | |
| THERMAL SHOCK | | 4.3 | |
| TEMP. CYCLING | | | |
| ACCELERATION | | | |
| SEAL | | | |
| PRE HTRB ELECTRICAL | 2.8 | | |
| HIGH TEMP. REVR. BIAS | | | |
| PRE BURN-IN ELECTRICAL | 1.4 | 1.8 | 1.4 |
| BURN IN | | | |
| POST BURN ELECTRICAL | 4.1 | 6.9 | 3.1 |
| GROUP A ELECTRICAL | | 16.4 | |
| RADIOGRAPHIC | 7.9 | 5.3 | 2.5 |
| PIND | 21.4 | 15.7 | |
| FINAL ELECTRICAL | | | |
| FINAL VISUAL | 3.0 | | |
| OTHER | 1.6 | | |
| OVERALL | 14.3% | 14.4% | 10.9% |

Figure 12. PART SCREENING RESULTS (MIL-SPEC PARTS)

## EFFECT OF BAD PARTS ON CIRCUIT BOARD YIELD

| GOOD PARTS Incoming Receiving | NUMBER OF PARTS ON BOARD | | | | |
|---|---|---|---|---|---|
| | 50 | 100 | 200 | 300 | 400 |
| 97% | 21.8% | 4.8% | 0.26% | 0.01% | 0.005% |
| 98% | 36.4% | 13.3% | 1.8% | 0.23% | 0.03% |
| 99% | 60.5% | 36.6% | 13.4% | 4.9% | 1.8% |
| 99.9% | 95.1% | 90.5% | 81.9% | 74.1% | 67.0% |
| 99.99% (1 IN 10,000 BAD) | 99.5% | 99.0% | 98.0% | 97.0% | 96.0% |

Figure 13. EFFECT OF BAD PARTS ON CIRCUIT BOARD YIELD

The faulty-parts problem in electronic systems has proven more difficult to solve. Equipment manufacturers receive a substantial percentage of defective parts from their vendors. In one incoming inspection (Figure 12), a group of some 25,000 MIL-SPEC semiconductor parts was rescreened to MIL-SPEC requirements and over 3,000 failed.

The cost of a bad part which finds its way into hardware depends on where it is first discovered. Studies several years ago showed that repair costs ranged from under $100 if the bad part was found early in the production line to over $15,000 if it escaped the factory and first showed up in the field. Screening of every semiconductor at incoming inspection has been proven very cost-effective and is now recommended to contractors. Much improved higher-level screens are also recommended to eliminate escapes—this will be discussed later. Most people think that when they specify MIL-M-38510 Level B parts they're buying high-rel parts. Figure 13 shows that the 2% defective rate allowable for MIL-SPEC parts results in a yield of only 36% for a circuit board with 50 parts. A defect rate of no more than 1 in 10,000 would result in a yield better than 99% for that same board.

Most contractors are upgrading their acceptable quality levels to 1 in 10,000 (0.01% defective). Many contractors have bought screening equipment, and their investments have paid off in nine months to a year just in reducing their "hidden factory," the rework that goes on in parallel with production operations. The hidden factory is said to cost the contractors, and ultimately the government, some $5 billion a year, or about 30% of total defense electronics procurement.

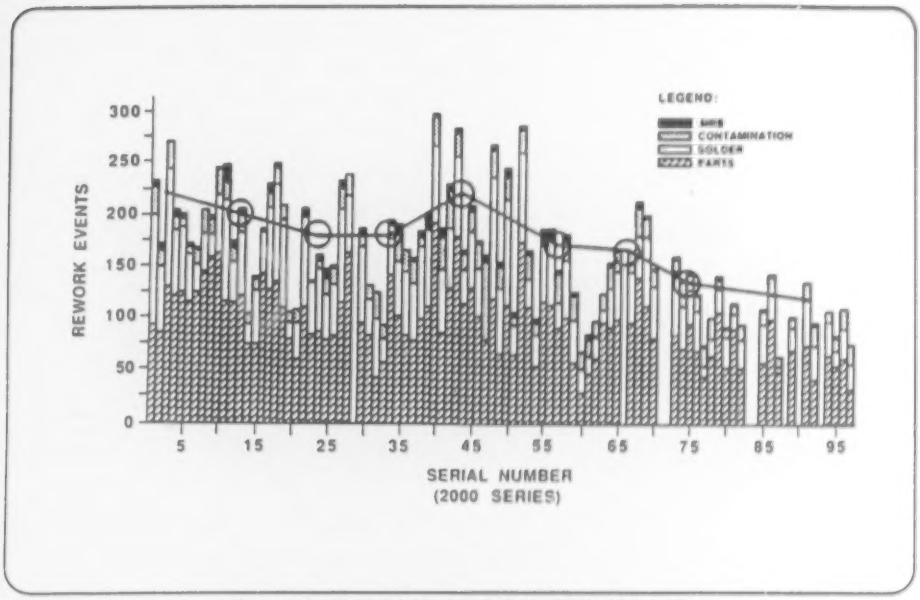



Figure 14. MANUFACTURING END ITEM VISIBILITY

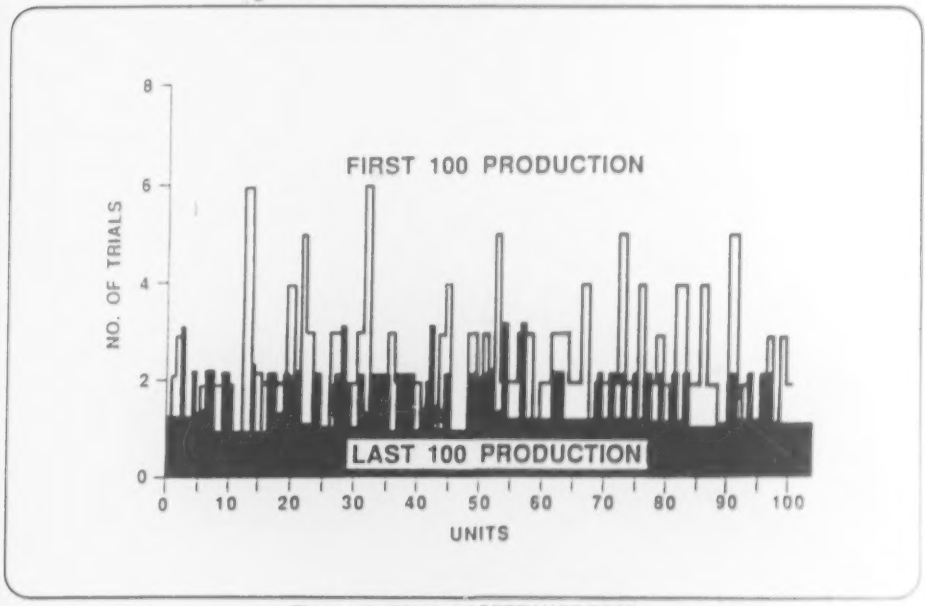



Figure 15. FINAL ACCEPTANCE TEST

Program management used to be unconcerned about the assembly and test activity in the factory which preceded acceptance testing. In rate production, all that was known about each end item was that it passed (or failed) its acceptance test. Insofar as the manufacturing process was concerned, only average trends were usually reported.

Figure 14 illustrates the number of factory rework events (parts replaced, solder defects, contamination, and scrap) for each serialized end item of an actual avionics system. The chart shows extreme variability between one unit produced and the

next over a ten-month period, clearly indicating an out-of-control manufacturing process. But traditionally, Military and contractor management see only the trend chart superimposed over it. This trend line based on the same data just as clearly shows a generally improving manufacturing process, and gives management a warm feeling that progress is being made, resulting in inattention and inaction.

The same variability exists in the number of acceptance test cycles required, and in the number of failures which occur during such testing. The implications are exceedingly strong that one end item is better than another, and this has been borne out conclusively in field trials.

An End Item Data Package (EIDP) was implemented for large programs which tracks the quality and production test history of individual serialized end items. The quality history is derived directly from the assembly work orders in the traveler on the factory floor, and the rework event count is based on a strictly defined set of ground rules categorizing all entries into classes tailored to the product. The test history includes all failures, discrepancies, anomalies, and their immediate disposition, as well as re-tests.

During the course of establishing and debugging the concept, the contractors and subcontractors learned much about their own processes which was previously unknown, due largely to (1) using production travelers as a primary data source, and (2) viewing their manufacturing operations from an end item serial number vantage point in addition to the conventional basis of combined trends of operation, inspection point, cost center, et al.

In addition, Military program managers had never before shown an interest in this deepest of all possible cuts in the technical side of the contractors' manufacturing operations. As a result of these considerations, contractors initiated many improvements and corrective actions immediately and within existing contract scope. The contractors were major beneficiaries of this added visibility in more effective control of their manufacturing operations. The bottom line for the same system as that of Figure 14 is illustrated in Figure 15, which shows the number of trials required to pass the final acceptance tests for the first 100 units produced (before the EIDP was implemented) and the last 100 units.

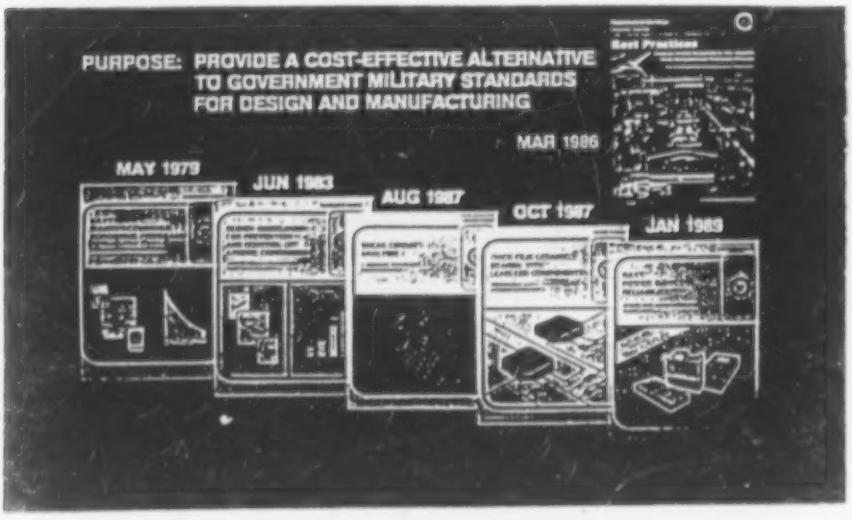



Figure 16. TECHNICAL GUIDELINE DOCUMENTS

### Technical Guideline Documents

A dearth of written materials describing this new approach and how to use it effectively in material acquisition programs led the Navy to develop its own technical guideline documents dealing with the most serious problems. Industry was called on to support this initiative, with Navy help as necessary. Those publications issued to date are illustrated in Figure 16.

The earliest need concerned manufacturing screening testing, based on the methods used successfully in the manned space program. Two manned space contractors, also major Navy suppliers, drafted the original material in what became NAVMAT P-9492, "Navy Manufacturing Screening Program" published in 1979. The publication caught the attention of the Institute of Environmental Sciences, which "grabbed the ball and ran with it," aiding in industry-wide acceptance of the concept of environmental stress screening. This popular document has been reprinted several times, and is now in the process of being updated and revised with Navy assistance and support.

Power supplies have been one of the Navy's most serious causes of equipment system downtime. Studies indicated that Fleet readiness could be improved significantly if electronic power supplies simply met their specified MTBF in service. Power supply design has not kept pace with the electronic design technology of the host systems. In 1981 the Navy asked an industry committee to document everything then known about how to design and manufacture reliable low-voltage power supplies. This committee recommended the proper range of values or course of action for each design and manufacturing attribute to ensure a reliable product. NAVMAT P4855-1, "Navy Power Supply Reliability" published in December 1982, has been updated by the original committee after distribution of 18,000 copies. Guidelines on high voltage power supplies were included in this update published in January 1989.

Ceramic circuit boards represent an emerging technology which attracted Navy attention when they caused serious reliability shortfalls in several major programs. The Navy assembled a committee of experts from most major players in this technology to document everything known to have any discernible bearing on ceramic circuit board reliability. "Thick Film Ceramic Boards With Leadless Components," NAVSO P-3651, was published in 1987 and probably represents the best reference for this technology presently in existence. It is already in great demand by every company making or using ceramic circuit boards.

Other publications in this series deal with avionic corrosion and sneak circuit analysis, and several more are in various stages of drafting or publication.

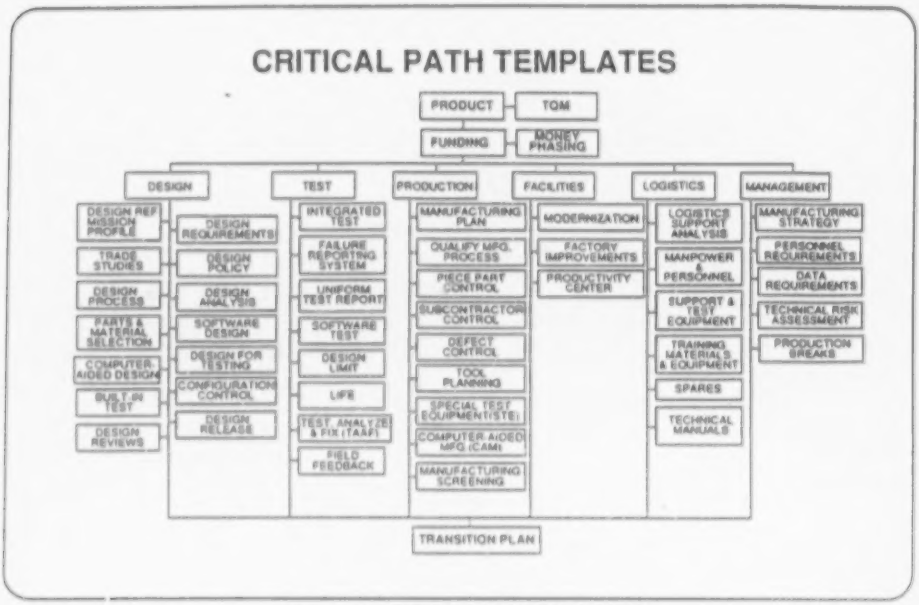



Figure 17. CRITICAL PATH TEMPLATES

## TRANSITION FROM DESIGN TO PRODUCTION: Best Practices

By the early 1980s, the need for expanding the attack on reliability was beginning to be recognized by the Department of Defense. The many specific design and manufacturing fundamentals and disciplines were seen as components of a transition process from development to production. And reliability from a global perspective was more appropriately thought of in terms of risk. The transition from development to production has proven to be a major source of defense system acquisition risk—risk of cost escalation, schedule slippage, failure in service, and reduced readiness.

It was generally acknowledged that the Navy had been successful for several years in applying industry committees to the researching and drafting of solutions to specific reliability problems. Consequently, in 1982 the Under Secretary of Defense (Research and Engineering) commissioned the Defense Science Board to organize a task force to be led by the Navy to examine defense systems acquisition

from an engineering viewpoint. This task force conducted a comprehensive study of the transition from development to production as it affects both reliability and risk.

The task force stated that "This industrial process of weapon system acquisition demands a better understanding and implementation of basic engineering and manufacturing disciplines. Once rigorous, disciplined engineering practices are employed and institutionalized, both the risk of deploying unsuitable weapon systems and the time in the acquisition cycle associated with design, test and production will be reduced."

The task force drafted a technical approach to the transition process which led to DoD Manual 4245.7-M, "Transition From Development to Production." The initiatives recommended in this "Transition Document" introduce technical discipline into the material acquisition process, complementing existing Department of Defense policies, directives, instructions, specifications, standards, et al., and defining their proper application in order to ensure low risk.

The Transition Document addresses specific technical issues which, based on industry experience with many programs, are revealed as having the greatest influence on acquisition risk, accounting for virtually all cost, schedule, and performance shortfalls in current systems. These technical issues are described in "templates" because each outlines a pattern for minimizing risk, reflecting best practices that defense systems contractors should follow in both new and ongoing programs. The Transition Document calls this carefully identified subset of technical issues the "critical path." These critical path templates are listed in Figure 17.

The Transition Document provides an overview of the critical path templates. The areas of risk may not be very convincing, particularly to first-time project managers. In its abbreviated form, the Transition Document isn't able to convey enough to the program manager and the contractor to understand the consequences of current approaches and the benefits of best practices. The program manager must have no doubt where he has erred, and how he can recover. He needs to be aware of what must be done to reduce the technical risk in a material acquisition program and to ensure performance in service with confidence.

To satisfy a growing demand for more detailed guidance, the Navy once again borrowed key technical executives, this time from several of the companies represented on the DSB Task Force. Combining their knowledge with Navy in-plant experience involving several hundred material acquisition programs, a new document was compiled describing for each template *proven* best practices for reducing risk. This "Best Practices Manual," NAVSO P-6071, has the subtitle "How to avoid surprises in the world's most complicated technical process," referring to the process of designing and manufacturing high-technology weapon systems.

Each template in the Transition Document is amplified in the Best Practices Manual. Up to now, certain critical elements in each template have often been approached by emphasizing the administrative process and disregarding the best practices of a disciplined technical process, resulting in high risk. The Best Practices Manual refers to these approaches, standard ways of doing business in today's defense systems acquisition environment, as "traps" since they are certain to place program success in jeopardy. The program manager will immediately relate to these traps, because with few exceptions he will find them in his project.

The best approach to material acquisition is the use of best practices from the beginning, through careful attention to the system specification and the contract, and effective management of the technical process during design, test and produc-

tion. However, the more likely situation finds the project loaded with traps. The earlier they are escaped, the greater the likelihood of successful performance in service.

The impact of escapes on cost and schedule vary from one trap to the next. The best practice in one instance may cost more, while in another instance the best practice is better use of resources, at a net cost saving. Increased cost in design or test may be offset in production as a result of lower reject rates and reduced rework, which will also improve delivery schedules.

Let's look at some specifics of the Best Practices approach to weapon systems. Those which we will consider here are: Design Analysis; Computer-Aided Design; Test, Analyze and Fix; Piece Part Control; Defect Control; and Manufacturing Screening. Each describes best practices found in industry. Wherever they are in use, they have proven their effectiveness above other known approaches to the same problem.

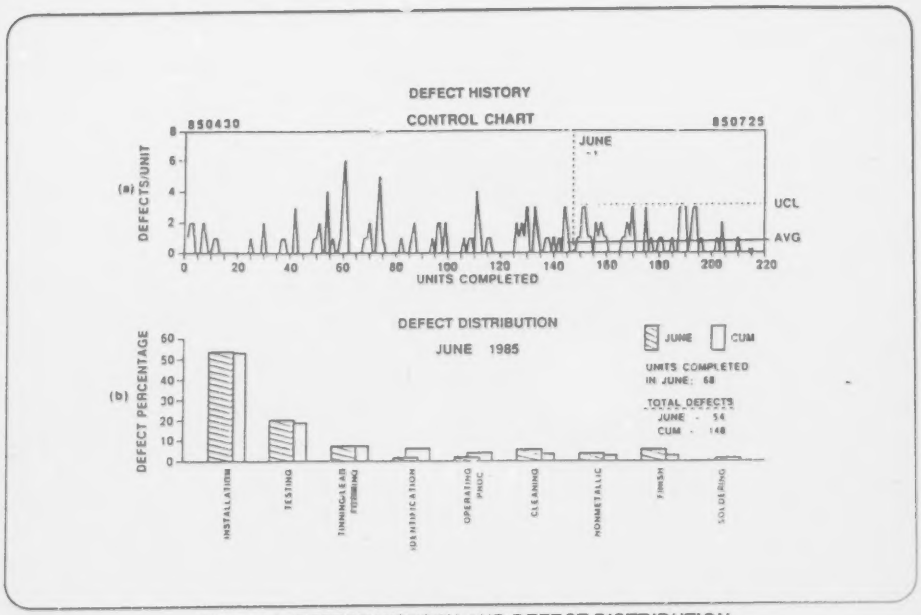



Figure 18. DEFECT HISTORY AND DEFECT DISTRIBUTION

**Design Analysis**. This template addresses the analyses required to reduce design risk to a minimum. Best practice requires that the designers conduct their own analyses to assure that no parts are overstressed, even under the worst combinations of environments specified by requirements, and that if the design includes semiconductors, no junction temperatures exceed 110°C. There must be no sneak circuits which, under certain conditions (but without part failure) can allow unwanted events to occur. And the effects of failure modes must be known and acceptable, otherwise redesign is required. Notice that reliability math models and predictions are not among the best practices.

**Computer-Aided Design**. DoD contractors are rapidly increasing their use of computer-aided design. In the near future, a company without a strong computer-aided design capability will not be in a competitive position for defense contracts against those companies who possess this capability. Its use results in a more complete design effort, with fewer engineering changes and less design uncertainty. For example, the potential exists for computer-aided design virtually to eliminate overstress when given the proper instructions. The same benefits will accrue in computer-aided manufacturing, wherein once the process is fine-tuned to eliminate setup errors, it can turn out consistently defect-free duplicates of the qualified design. Investment in computer-aided design and manufacturing is clearly a major step in improving industrial productivity.

**Test, Analyze and Fix**. Many past development contracts did not include reliability development testing, relying instead on reliability demonstration tests to validate a numerical MTBF requirement. As discussed earlier, rel demo has been ineffective in providing weapon systems with acceptable field reliabilities—it is not a best practice. Reliability development (TAAF) testing using simulated mission profile environments and emphasizing reliability growth has proven to be a vastly more effective use of limited test resources.

**Piece Part Control**. Most military projects require the use of military standard parts in defense systems. This policy, although better than using commercial parts, leaves much to be desired in its ability to ensure delivery of high quality and reliable parts. Industry has found that 100% re-screening of semiconductor parts is a highly cost-effective best practice, both from the contractor's and the government's viewpoints. With the 100% re-screening of semiconductor piece parts and ultimately a limit of 1 defect per 10,000, our aim is "First Time Turn-On Success!"

**Defect Control**. Contractors have countless systems for reporting manufacturing defects. The most effective system for management oversight of quality includes three types of data or charts: defect history, defect distribution, and defect reduction. Defect history (top of Figure 18) illustrates the number of defects per item by serial number or date-of-manufacture sequence, and is equivalent to the EIDP chart illustrated in Figure 14. It clearly flags not only general trends toward improvement but also production line problems in adjacent units produced. The Gantt-type defect distribution chart (bottom of Figure 18) identifies the types of defects by category and percentage occurrence.

Defect reduction data (Figure 19) tracks the average number of defects per unit by cumulative number of units produced to measure quality growth or the learning curve in the manufacturing process.

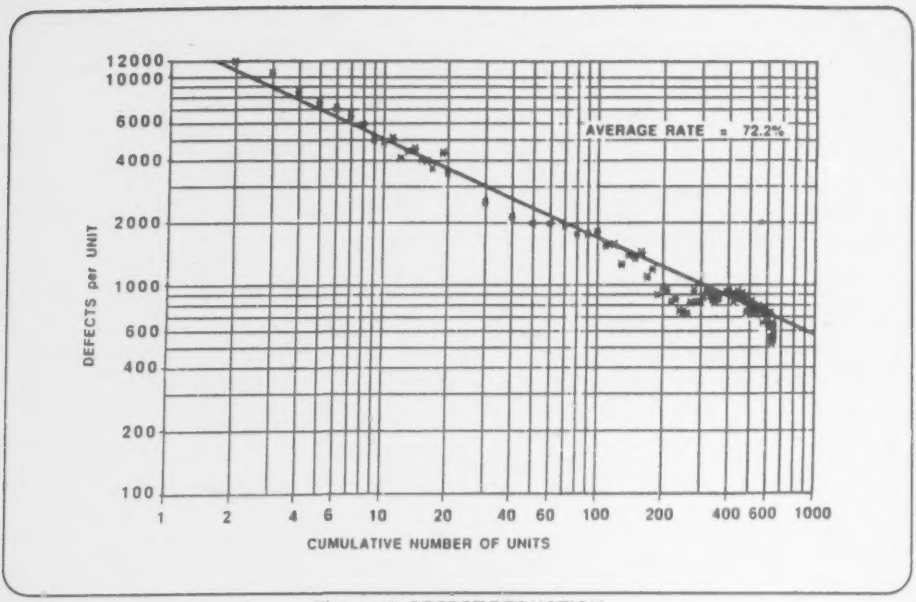



Figure 19. DEFECT REDUCTION

Temperature Cycling

- Range
  -55°C to +55°C (Nominal)
- Temperature Rate of Change
  Approximately 22°C/Min Chamber Air and Inlet Control Air
  Adjust for Average 10°/Min Seen at the Part
- Dwell
  Adjust for Best Response on Internal Parts
- Cycles
  Minimum 10, Average 15
  At Least 5 Occurring After Vibration
  Last Cycle Failure-Free
- Power
  On and Functions Monitored (Except during Cooldown)
  3 on/off Cycles at Temperature Extremes

Vibration: Broadband Random or Pseudo/Quasi-Random

- Level
  6G RMS, 100-1000HZ (with option to shape spectrum and limit power spectral density to not less than 4G RMS to avoid resonances or equipment damage)
- Axes
  3 Axes
- Duration
  10 to 12 Mins/Axis with Sequential Stimulation
  10 to 12 Mins Total Concurrent Stimulation
- Power
  On and functions monitored

Figure 20. ENVIRONMENTAL STRESS SCREENING AT UNIT LEVEL

With vigorous control of the causes of defects, this data tends to follow a straight line on a log-log chart, and its downward slope can be used as a measure of defect management. In fact, the learning curve concept, which has been around since the 1930's, can be used to compare quality growth in a program today to that of any other program where similar data was kept. This provides an excellent indicator as to whether or not defect management initiatives are meeting reasonable expectations in a given program.

**Manufacturing Screening**. All services now utilize environmental stress screening (ESS) to prevent manufacturing defects from escaping the factory, and include requirements for ESS in their contracts for the production phase. Figure 20 illustrates joint Navy/Air Force requirements for completed assemblies (Weapon Replaceable Assemblies, Line Replaceable Units) of a radar system manufactured by the same contractor for Navy and Air Force applications.

## PROFESSIONALIZING THE DEFENSE ACQUISITION WORKFORCE

The President's Blue Ribbon Commission on Defense Management ("Packard Commission"), in its final report to President Reagan in 1986, stated that:

> "The defense acquisition work force mingles civilian and military expertise in numerous disciplines for management and staffing of the world's largest procurement organization. Each year billions of dollars are spent more or less efficiently, based on the competence and experience of these personnel. Yet, compared to its industry counterparts, this workforce is undertrained, underpaid, and inexperienced."

The Commission found it vitally important to enhance the quality of the defense acquisition workforce—both by attracting qualified new personnel and by improving the training and motivation of current personnel. Their report confirmed the central importance of improving the quality of training and facilitating greater professionalism, with early emphasis on program managers and contracting officers.

Yet the Commission addressed head-on only the management issues which contribute to excessive acquisition cycle time and cost, performance shortfalls, and inordinate support requirements—the elements of high defense acquisition risk.

Efforts by the acquisition workforce to ensure the use of best design and manufacturing practices and processes have encountered the problem of inadequate or nonexistent references in many subject areas. References and resources for the templates are scattered, often existing as technical reports, standard practices in corporate manuals, and informal documentation. Specific references for some are nonexistent. Some of the templates concern basic engineering fundamentals, emphasizing design approaches which have seldom been included in academic curricula. Others involve the practical applications of those fundamentals, approaches which have been proven to reduce or eliminate risk through their use in successful programs. Still others are based simply on time-tested industry experience. As templates are tailored to specific programs, and as more experience is gained in their application and use, they are frequently modified and refined, which further complicates the references and resources picture.

What has become apparent is that the defense acquisition workforce lacks enough professional industry experience to utilize the templates effectively. The practical engineering and manufacturing know-how evolved by industry on-the-job and embodied in the templates is not taught in formal engineering curricula. Industry generally retains a greater range and depth of corporate knowledge and technical experience than the government because design and manufacturing is its stock in trade, while government programs are affected by large personnel turnovers, limited hiring flexibility, engineers without industry experience, program sponsors without sufficient technical background, and program managers with little appreciation for design and manufacturing fundamentals. There are other factors involved, of course, such as affordability, politics, competition and procurement legislation. Present results, therefore, are largely dependent on individual knowledge and experience, which vary widely throughout the workforce.

President Bush, in a February 1989 address to Congress, called for full implementation of the recommendations of the Packard Commission. A Defense Management Review stated in June of this year that "DoD...will seek to increase the professionalism of its procurement workforce to make its employees' capabilities and career opportunities more competitive with those of their private sector counterparts."

**The Navy Technical Education Program**

Recommendations aimed at professionalizing the workforce include government sponsorship of graduate instruction in acquisition management. Unfortunately, there are currently no courses available to civilians and military personnel in the workforce which teach the technical processes of defense acquisition. To solve this problem, the Navy has instituted a unique approach to developing and deploying a technical education program.

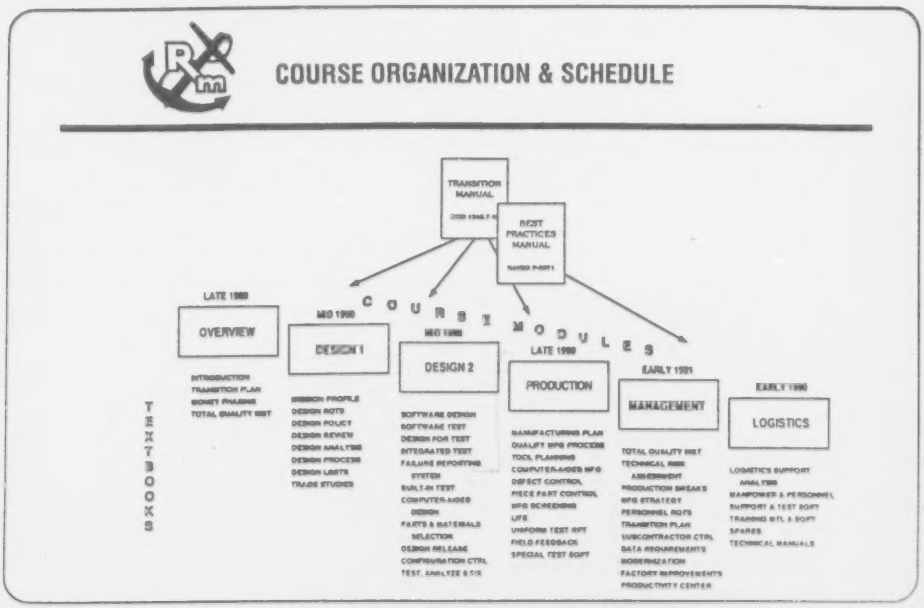



Figure 21. COURSE ORGANIZATION AND SCHEDULE

The Navy has called on industry to assist in the implementation of educational programs to indoctrinate the material acquisition community—industry and government alike—in the fundamentals of critical path templates and best design and manufacturing practices. A formal effort began in early 1988 with a contract to AT&T Federal Systems, Ocean System Division. This division assigned AT&T Bell Laboratories the task of preparing comprehensive reference books for each template, while AT&T Corporate Education and Training is developing the education program itself.

The goals of the education program are threefold:

- To clarify template concepts and methods
- To promote information exchange among participants
- To develop action plans for individual skill improvement

Initially, specific courses are planned for four Navy audiences:

- Program managers and their immediate staff
- Technical support personnel—cognizant engineers
- Nontechnical support personnel (contracts, finance, etc.)
- Flag officers/Senior Executive Service personnel

The course organization and planned deployment schedule are shown in Figure 21. All courses contain overview material describing the templates and their interrelationships. Each course will address specific issues for a particular group by presenting template details, supporting case studies, and by providing an opportunity for group dialogue. Student involvement is a key feature. Students will be asked to develop a personal action plan which includes their evaluation of which templates they can use immediately, which ones may be used after more details are known, and how their activities relate to others who are also using the templates.

This educational program will be readily available through a nationwide system of community colleges being organized by the Technology Exchange Center, a Navy contractor. Courses will be delivered by highly qualified and certified instructors who have demonstrated experience in template issues either in industry or academia. A computer network will connect participating colleges to provide available course schedules and new developments in template topics to interested DoD organizations. A program to deliver courses on site to identified groups of government and industry students is being designed to minimize travel expenses.

## CONCLUDING REMARKS

Improved reliability and quality provide the only means of sustaining our defense preparedness while at the same time reducing life cycle cost in our outlays for

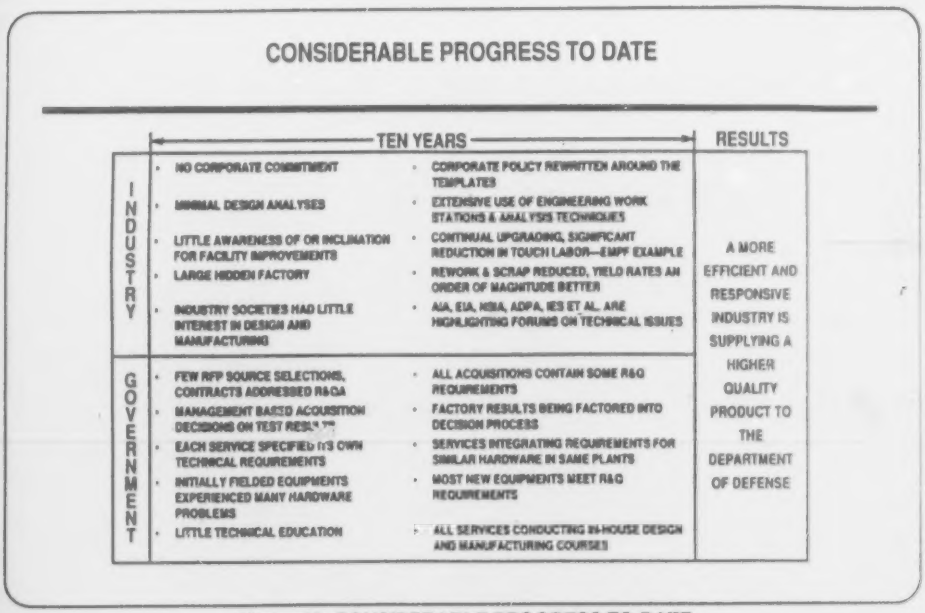

CONSIDERABLE PROGRESS TO DATE
TEN YEARS
RESULTS
INDUSTRY
NO CORPORATE COMMITMENT
MINIMAL DESIGN ANALYSES
LITTLE AWARENESS OF OR INCLINATION FOR FACILITY IMPROVEMENTS
LARGE HIDDEN FACTORY
INDUSTRY SOCIETIES HAD LITTLE INTEREST IN DESIGN AND MANUFACTURING
CORPORATE POLICY REWRITTEN AROUND THE TEMPLATES
EXTENSIVE USE OF ENGINEERING WORK STATIONS & ANALYSIS TECHNIQUES
CONTINUAL UPGRADING, SIGNIFICANT REDUCTION IN TOUCH LABOR—EMPF EXAMPLE
REWORK & SCRAP REDUCED, YIELD RATES AN ORDER OF MAGNITUDE BETTER
AIA, EIA, NSIA, ADPA, IES ET AL. ARE HIGHLIGHTING FORUMS ON TECHNICAL ISSUES
GOVERNMENT
FEW RFP SOURCE SELECTIONS, CONTRACTS ADDRESSED R&QA
MANAGEMENT BASED ACQUISITION DECISIONS ON TEST RESULTS
EACH SERVICE SPECIFIED ITS OWN TECHNICAL REQUIREMENTS
INITIALLY FIELDED EQUIPMENTS EXPERIENCED MANY HARDWARE PROBLEMS
LITTLE TECHNICAL EDUCATION
ALL ACQUISITIONS CONTAIN SOME R&Q REQUIREMENTS
FACTORY RESULTS BEING FACTORED INTO DECISION PROCESS
SERVICES INTEGRATING REQUIREMENTS FOR SIMILAR HARDWARE IN SAME PLANTS
MOST NEW EQUIPMENTS MEET R&Q REQUIREMENTS
ALL SERVICES CONDUCTING IN-HOUSE DESIGN AND MANUFACTURING COURSES
A MORE EFFICIENT AND RESPONSIVE INDUSTRY IS SUPPLYING A HIGHER QUALITY PRODUCT TO THE DEPARTMENT OF DEFENSE

Figure 22. CONSIDERABLE PROGRESS TO DATE

new weapon systems. For the first time in recent history, the Army, Navy, and Air Force are in fundamental agreement on the priority of reliability in their weapon system requirements. Even more significant is mutual recognition that reliability is achieved not by setting numerical requirements and testing for compliance, but by focusing on the fundamentals of design and manufacturing; and that quality is achieved not by counting defects but by eliminating their causes.

These lessons, long in coming to the Department of Defense and its contractors, are now beginning to be applied in the acquisition or upgrading of most weapon systems. Figure 22 summarizes the major changes in our defense material acquisition environment over the last 10 years in both industry and the Department of Defense. The left side highlights the situation that existed early in this decade, while the right side shows the changes that have occurred to bring us to where we are today. We've attained a level of momentum which, if sustained, will continue to strengthen our national security well into the future, and with God's continued help, the momentum of this effort will bring even greater success to our ability to deliver quality products for the defense of our Nation.

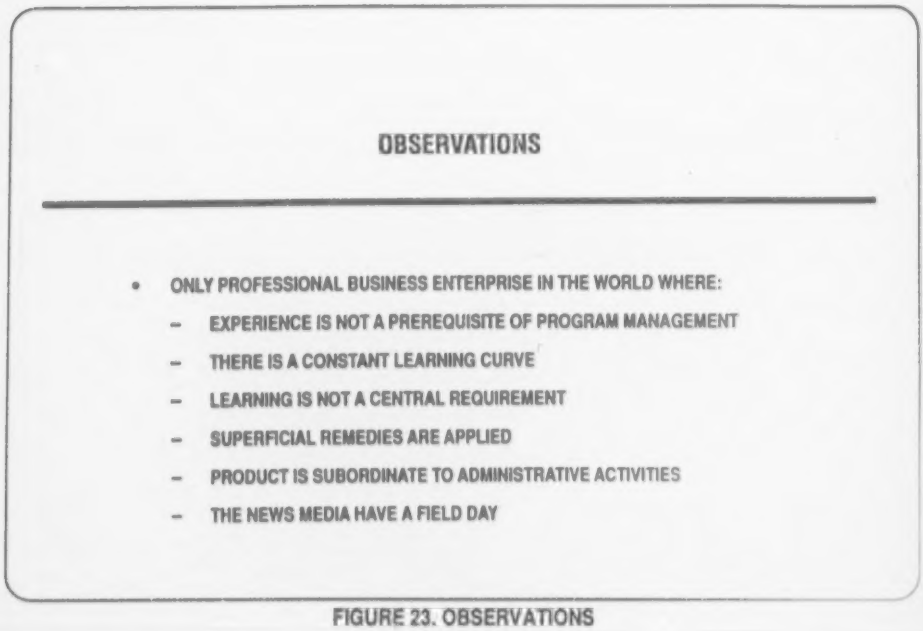

OBSERVATIONS
• ONLY PROFESSIONAL BUSINESS ENTERPRISE IN THE WORLD WHERE:
– EXPERIENCE IS NOT A PREREQUISITE OF PROGRAM MANAGEMENT
– THERE IS A CONSTANT LEARNING CURVE
– LEARNING IS NOT A CENTRAL REQUIREMENT
– SUPERFICIAL REMEDIES ARE APPLIED
– PRODUCT IS SUBORDINATE TO ADMINISTRATIVE ACTIVITIES
– THE NEWS MEDIA HAVE A FIELD DAY

FIGURE 23. OBSERVATIONS

## FOCUSING ON THE PROBLEM

- DEFENSE SCIENCE BOARD QUOTE:
  - CAUSES OF ACQUISITION PROBLEMS ARE TECHNICAL, NOT MANAGERIAL
  - DOD CORRECTIVE MEASURES HAVE FOCUSED ON MANAGEMENT FIRST
- THE PROBLEM—THE HIDDEN FACTORY
  - AS MUCH AS 30% REWORK CYCLE
    - DESIGN < ENGINEERING CHANGE NOTICES; ENGINEERING NOTICES
      WORKSTATIONS
    - MANUFACTURING < 80% ART, 20% SCIENCE
      100 PARTS PER MILLION STANDARD
  - REQUIRES MORE CORPORATE KNOWLEDGE OF, AND INVESTMENT IN THE CRITICAL ASPECTS OF DESIGN, TEST AND MANUFACTURING
  - MBA HAS HURT CORPORATE AMERICA

Figure 24. FOCUSING ON THE PROBLEM

## FOCUSING ON THE PROBLEM (CONT'D)

- TO BUILD A QUALITY PRODUCT ALL THE VARIABLES MUST BE UNDER CONTROL
  - DESIGN TO COST
  - LIFE CYCLE COST
  - ZERO DEFECTS
  - QUALITY CIRCLES
  - CONCURRENT ENGINEERING
  - TOTAL QUALITY MANAGEMENT
  - STATISTICAL PROCESS CONTROL
  - ACQUISITION STREAMLINING

  > ALL HAVE ONE COMMON FLAW—UNLIKE INDUSTRY ALL THE VARIABLES CANNOT BE CONTROLLED

Figure 25. FOCUSING ON THE PROBLEM (CONT'D)

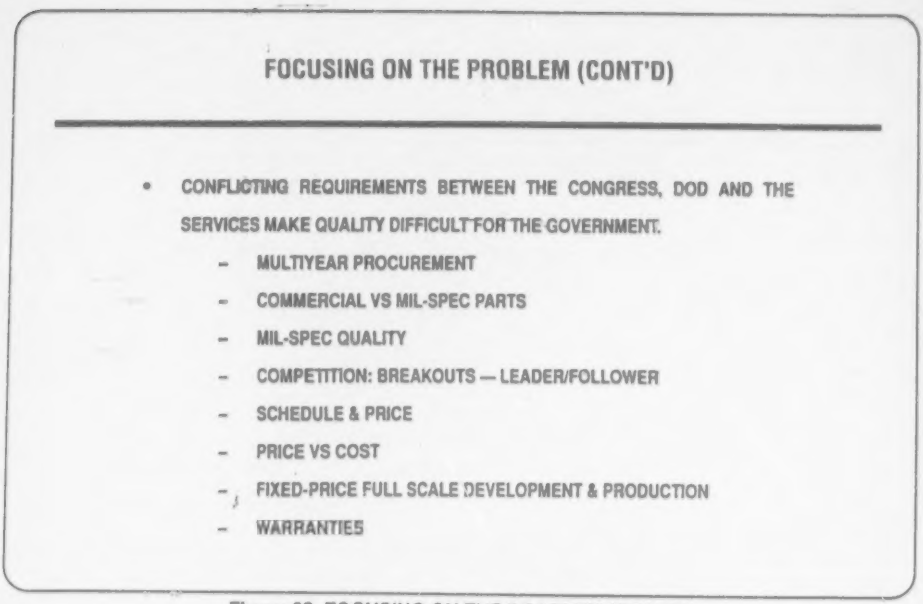

FOCUSING ON THE PROBLEM (CONT'D)
• CONFLICTING REQUIREMENTS BETWEEN THE CONGRESS, DOD AND THE SERVICES MAKE QUALITY DIFFICULT FOR THE GOVERNMENT.
– MULTIYEAR PROCUREMENT
– COMMERCIAL VS MIL-SPEC PARTS
– MIL-SPEC QUALITY
– COMPETITION: BREAKOUTS — LEADER/FOLLOWER
– SCHEDULE & PRICE
– PRICE VS COST
– FIXED-PRICE FULL SCALE DEVELOPMENT & PRODUCTION
– WARRANTIES

Figure 26. FOCUSING ON THE PROBLEM (CONT'D)

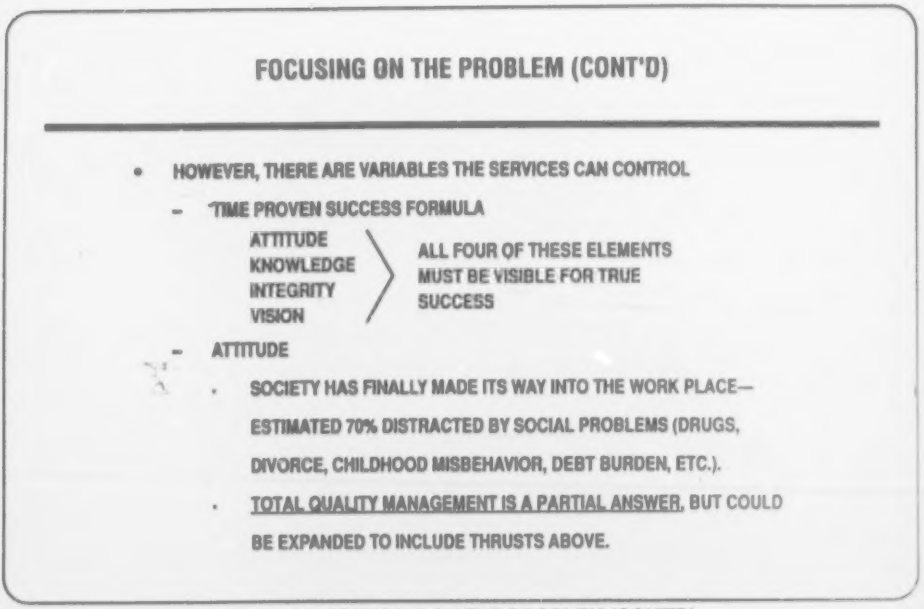

FOCUSING ON THE PROBLEM (CONT'D)
• HOWEVER, THERE ARE VARIABLES THE SERVICES CAN CONTROL
– TIME PROVEN SUCCESS FORMULA
ATTITUDE
KNOWLEDGE
INTEGRITY
VISION
ALL FOUR OF THESE ELEMENTS MUST BE VISIBLE FOR TRUE SUCCESS
– ATTITUDE
• SOCIETY HAS FINALLY MADE ITS WAY INTO THE WORK PLACE— ESTIMATED 70% DISTRACTED BY SOCIAL PROBLEMS (DRUGS, DIVORCE, CHILDHOOD MISBEHAVIOR, DEBT BURDEN, ETC.).
• TOTAL QUALITY MANAGEMENT IS A PARTIAL ANSWER, BUT COULD BE EXPANDED TO INCLUDE THRUSTS ABOVE.

Figure 27. FOCUSING ON THE PROBLEM (CONT'D)

## FOCUSING ON THE PROBLEM (CONT'D)

- KNOWLEDGE
  - FROM A PURELY TECHNICAL POINT OF VIEW, MOST CONTRACTUAL PROBLEMS CAN BE TRACED TO LACK OF KNOWLEDGE OF THE DESIGN AND MANUFACTURING PROCESS.
  - DSB TEMPLATES, ELECTRONICS MANUFACTURING PRODUCTIVITY FACILITY AND BEST MANUFACTURING PRACTICES ARE IN PLACE TO COMBAT THIS SITUATION.
- INTEGRITY
  - PROGRAMS ARE CONSISTENTLY PROMOTED THAT CANNOT BE ACCOMPLISHED AS ADVERTISED.
  - INSIST ON INTELLECTUAL HONESTY/TRUTH IN ADVERTISING.
- VISION
  - PROMOTE LEADERSHIP. ENCOURAGE PROGRAM MANAGERS TO BE INNOVATIVE IN GETTING FROM A TO B RATHER THAN "SAFELY" FOLLOWING THE BUREAUCRATIC PROCESS.

Figure 28. FOCUSING ON THE PROBLEM (CONT'D)

## POSSIBLE SOLUTIONS

- INCREASE KNOWLEDGE OF DESIGN AND MANUFACTURING PROCESS BY INTENSIVE EDUCATION REQUIREMENTS AND FUNDING
  - NAVY HAS RECOGNIZED EDUCATIONAL NEEDS
  - AT&T BELL LABS EMPLOYED TO DEVELOP DESIGN AND MANUFACTURING TEXT BOOKS
  - CAMPUS CENTERS BEING ESTABLISHED AS WELL AS GOVERNMENT & INDUSTRY SITES
- EXPAND THE VISION OF TOTAL QUALITY MANAGEMENT
- ELIMINATE THE PRIORITY OF MIL-SPECS
- INJECT A MATERIAL READINESS ELEMENT INTO THE DECISION MAKING PROCESS
- ESTABLISH BETTER TECHNICAL INTERFACES WITH CONGRESS—NON-PROGRAM SPECIFIC

Figure 29. POSSIBLE SOLUTIONS

## CONTINUING CONCERNS

- BETTER TECHNICAL INTERFACE WITH CONGRESS—NON-PROGRAM-SPECIFIC
- LOW-COST MENTALITY
- CONFLICTING REQUIREMENTS
- BUREAUCRACY
- MILITARY SPECIFICATIONS

Figure 30. CONTINUING CONCERNS

# SECTION II

# NAVY MANUFACTURING TECHNOLOGY PROGRAM

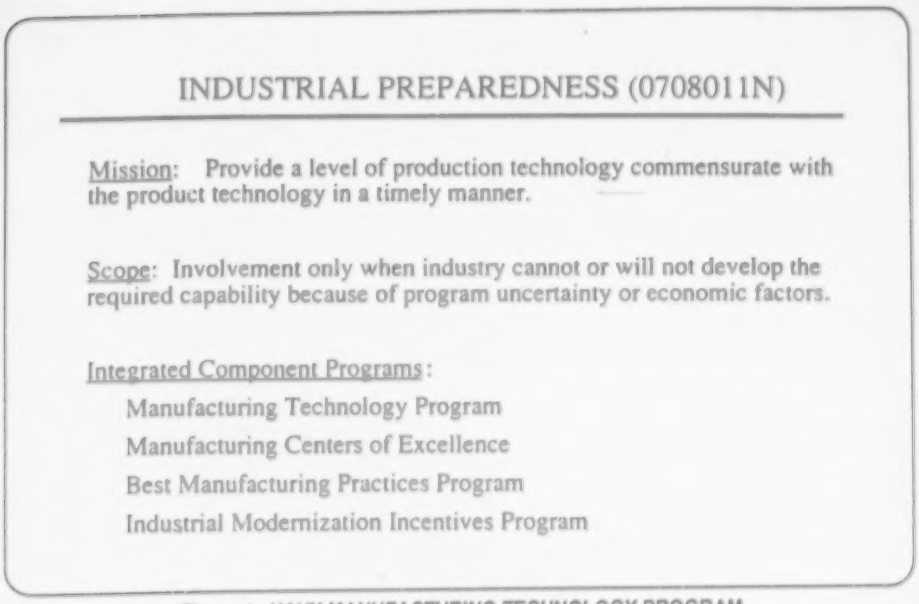

INDUSTRIAL PREPAREDNESS (0708011N)
Mission: Provide a level of production technology commensurate with the product technology in a timely manner.
Scope: Involvement only when industry cannot or will not develop the required capability because of program uncertainty or economic factors.
Integrated Component Programs:
Manufacturing Technology Program
Manufacturing Centers of Excellence
Best Manufacturing Practices Program
Industrial Modernization Incentives Program

Figure 1. NAVY MANUFACTURING TECHNOLOGY PROGRAM

Figure 1.

The Industrial Preparedness Line (0708011N) supports several programs, all of which have as their goal the infusion of advanced manufacturing processes and equipment into Navy contractor production facilities. This technology, inherently more efficient, results in lower cost, higher quality and improved delivery schedule for Navy weapon systems. It should be noted that Navy funding is utilized only when contractor investment is not available.

The overall program is composed of four integrated components: Manufacturing Technology (MANTECH), Manufacturing Centers of Excellence, the Best Manufacturing Practices Program (BMP) and the Industrial Modernization Incentives Program (IMIP).

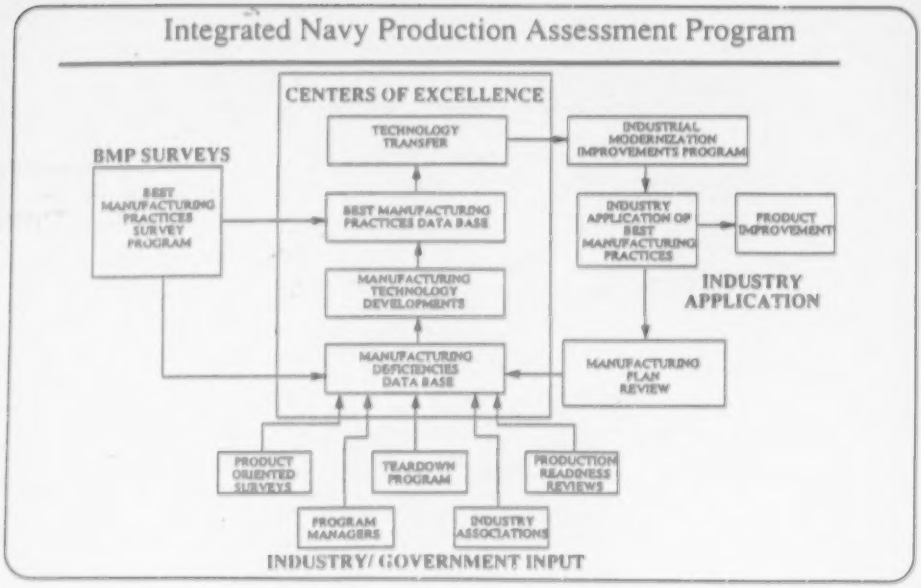



Figure 2. INTERGRATED NAVY PROGRAM

Figure 2.

This viewgraph shows how the four component programs are integrated to provide a closed loop cycle resulting in product improvement. Central to this scheme is the existence of the Centers of Excellence, which will be discussed later.

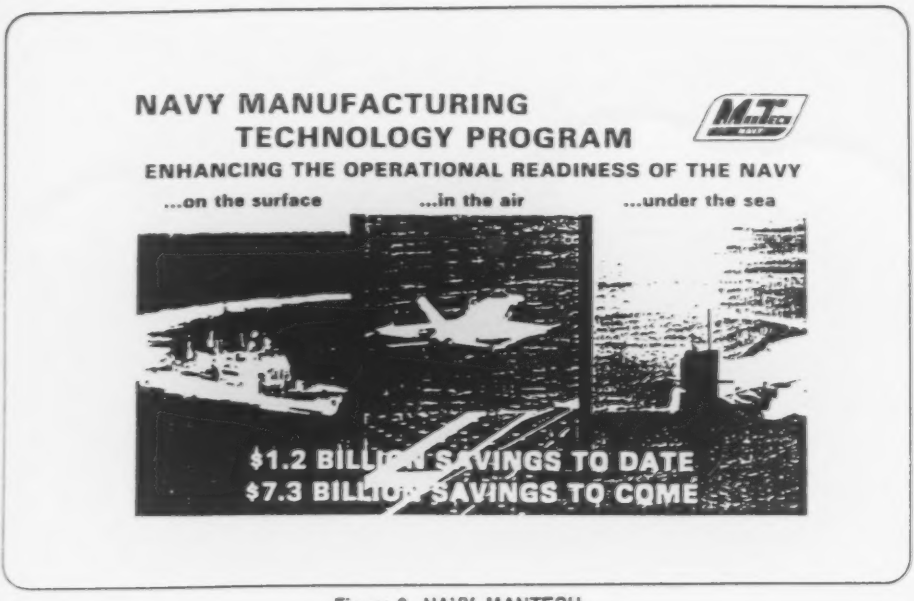



Figure 3. NAVY MANTECH

Figure 3.

The MANTECH program, which provides funding for the development of critical manufacturing technology, has proven to be a most cost effective mechanism for the Navy, resulting in savings of $1.2B to date, with a projected $7.3B 10 year savings on current projects.

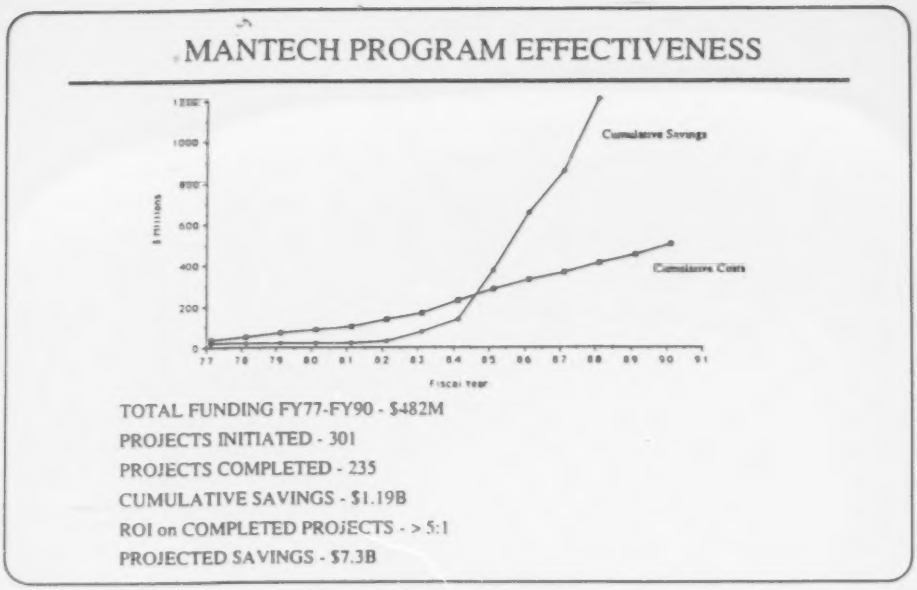



Figure 4. MANTECH EFFECTIVENESS

Figure 4.

This viewgraph illustrates cumulative cost of the MANTECH program versus cumulative savings to date. The return on investment (ROI) for completed projects is 8.5 : 1, with 10 year ROI anticipated to exceed 20:1.

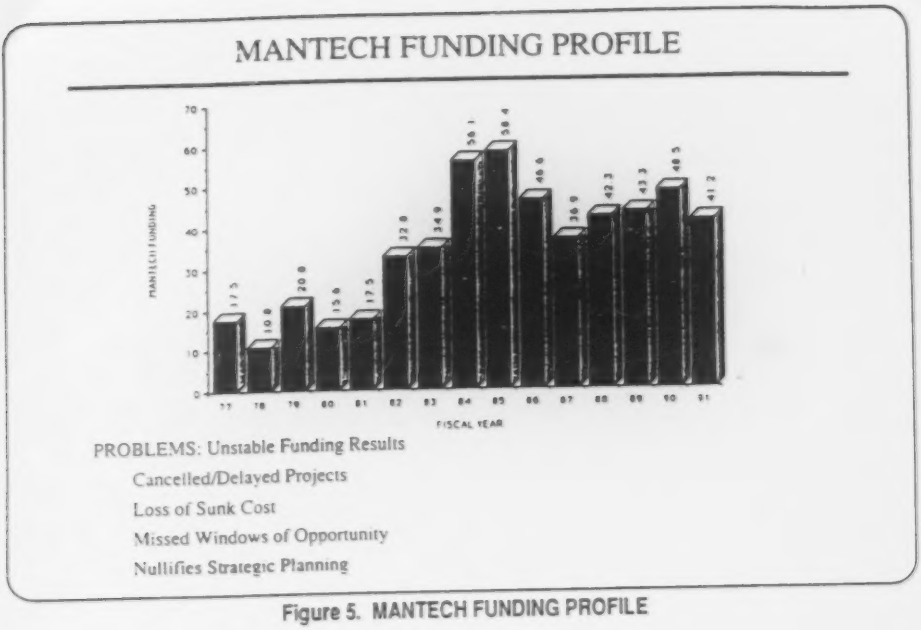



Figure 5. MANTECH FUNDING PROFILE

Figure 5.

The program, despite excellent results, has historically suffered from a lack of support in the budget process. As shown, the graph of funding over time resembles a roller coaster with wide swings in funding from year to year. This unstable profile has nullified any meaningful planning effort and has resulted in cancellations with subsequent loss of sunk cost, delays and stretched-out programs, and missed windows of opportunity.

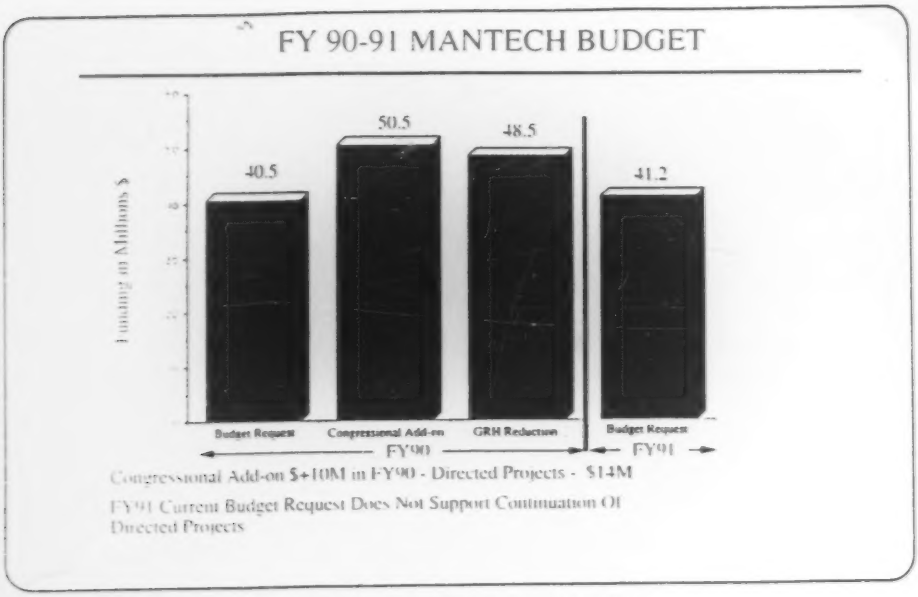



FIGURE 6. FY90-91 MANTECH BUDGET

Figure 6.

In response to your question concerning the drop in funding from FY90 to FY91, this viewgraph illustrates the chain of events. The original FY90 request was for $40.5M. Congressional budget action added $10M for specific directed projects. Subsequent Gramm-Rudman-Hollings (GRH) and Program Budget Decision (PBD) action reduced this figure to $48.5. It should be noted that due to the directed projects, these actions have resulted in a shortfall of $4.8M in FY90. The FY91 request was for $41.2M, however, the directed projects have multi-year implications which result in a real shortfall of $10M for continuation of FY90 starts in FY91 and beyond.

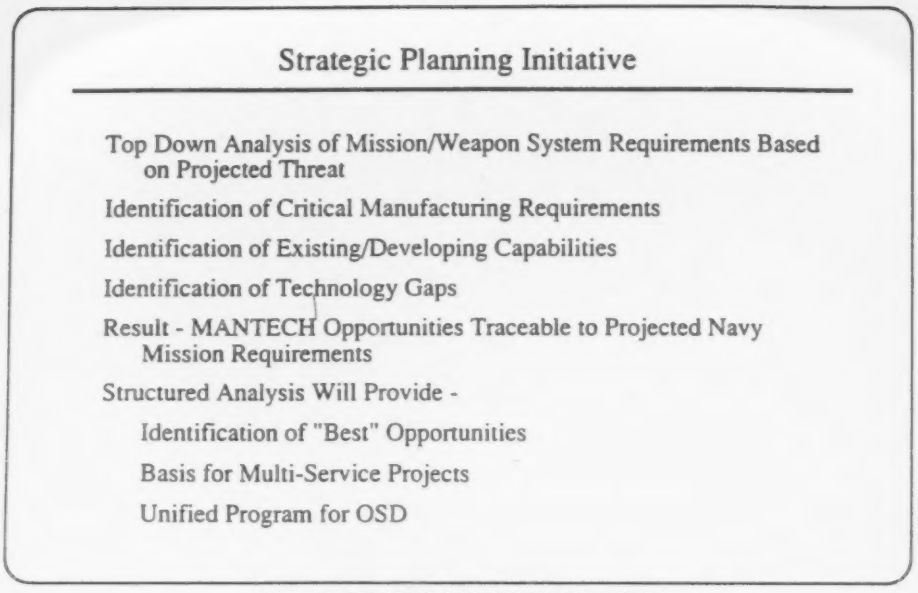

Strategic Planning Initiative
Top Down Analysis of Mission/Weapon System Requirements Based on Projected Threat
Identification of Critical Manufacturing Requirements
Identification of Existing/Developing Capabilities
Identification of Technology Gaps
Result - MANTECH Opportunities Traceable to Projected Navy Mission Requirements
Structured Analysis Will Provide -
Identification of "Best" Opportunities
Basis for Multi-Service Projects
Unified Program for OSD

Figure 7. STRATEGIC PLANNING INITIATIVE

Figure 7.

In anticipation of a more stable budget in the FY90's, we have initiated a Strategic Planning Initiative. This effort will result in a more structured approach to project selection, and emphasizes the maximization of application to Navy needs. Additionally, this effort should provide a logical basis for multi-service cooperation on projects of mutual interest.

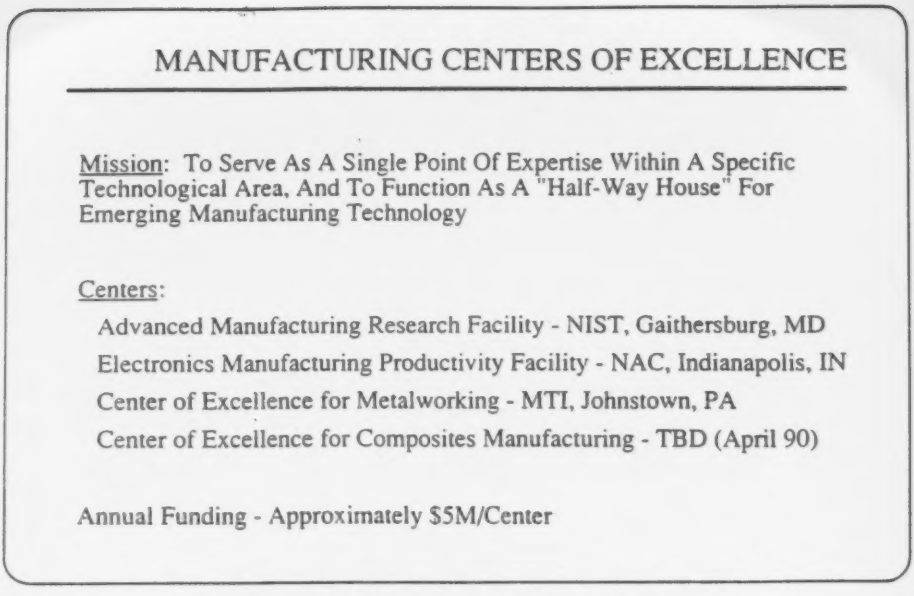

MANUFACTURING CENTERS OF EXCELLENCE
Mission: To Serve As A Single Point Of Expertise Within A Specific Technological Area, And To Function As A "Half-Way House" For Emerging Manufacturing Technology
Centers:
Advanced Manufacturing Research Facility - NIST, Gaithersburg, MD
Electronics Manufacturing Productivity Facility - NAC, Indianapolis, IN
Center of Excellence for Metalworking - MTI, Johnstown, PA
Center of Excellence for Composites Manufacturing - TBD (April 90)
Annual Funding - Approximately $5M/Center

**Figure 8. MANUFACTURING CENTERS OF EXCELLENCE**

Figure 8.

The centerpiece of our program, over the last several years, has been the establishment of Manufacturing Centers of Excellence. These centers function both as single points of expertise in specific areas, as well as a "half-way house" for emerging technology. Currently, three such centers are operating in the areas of integrated processing, electronics and metalworking, with a fourth, in the area of composites, to be instituted this fiscal year (contract award third quarter FY90).

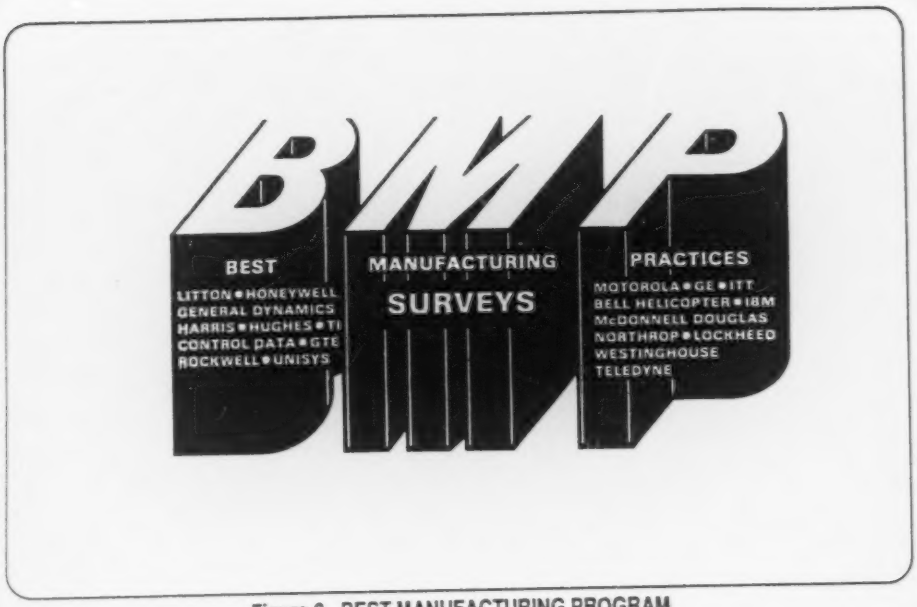



Figure 9. BEST MANUFACTURING PROGRAM

Figure 9.

Recognizing that a great deal of expertise resided within industry, the Best Manufacturing Practices Survey Program was instituted to facilitate the transfer of technology from company to company.

## BEST MANUFACTURING PRACTICES PROGRAM

Industry-Driven

Provides Mechanism For Companies (Large & Small) To Exchange Data On Successful Manufacturing Techniques

Navy Serves As Catalyst

Established In 1985

Status -

- 34 Surveys To Date
- "Waiting List" Of 18 Companies requesting involvement
- Cadre Of 60 Trained Professionals
- BMP Database Established
- Annual Workshop Open To All DoD Contractors
- Over 100 Demonstrated Cases Of Technology Transfer

**Figure 10. BEST MANUFACTURING PROGRAM SUMMARY**

Figure 10.

The Navy serves as a catalyst for this transfer by surveying contractor facilities and cataloging practices which result in high yield and good quality. These surveys are voluntary, 34 companies have been surveyed, and 18 companies have an interest in being surveyed. Results of these surveys are published, widely distributed and maintained in a database which is easily accessed. Over 100 cases of technology transfer have been documented.

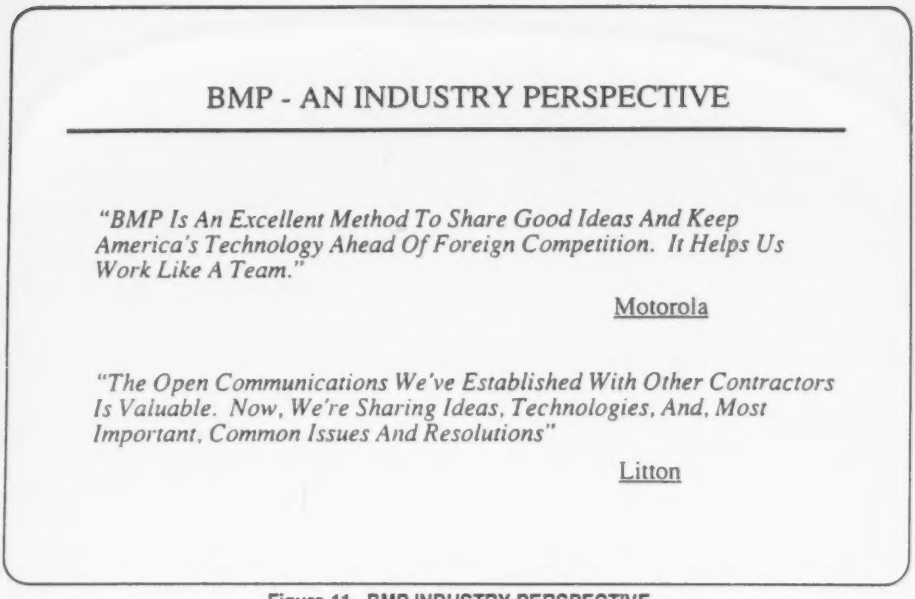

BMP - AN INDUSTRY PERSPECTIVE
"BMP Is An Excellent Method To Share Good Ideas And Keep America's Technology Ahead Of Foreign Competition. It Helps Us Work Like A Team."
Motorola
"The Open Communications We've Established With Other Contractors Is Valuable. Now, We're Sharing Ideas, Technologies, And, Most Important, Common Issues And Resolutions"
Litton

Figure 11. BMP INDUSTRY PERSPECTIVE

Figure 11.

The strength of the BMP program is the voluntary industry participation itself. The Navy provides the opportunity for sharing, and industry has enthusiastically responded.

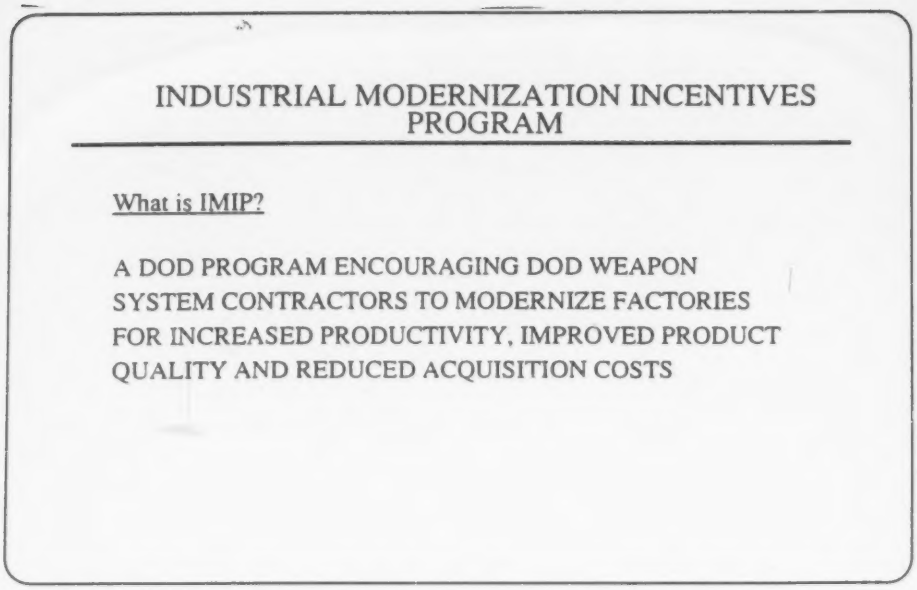

INDUSTRIAL MODERNIZATION INCENTIVES PROGRAM
What is IMIP?
A DOD PROGRAM ENCOURAGING DOD WEAPON SYSTEM CONTRACTORS TO MODERNIZE FACTORIES FOR INCREASED PRODUCTIVITY, IMPROVED PRODUCT QUALITY AND REDUCED ACQUISITION COSTS

Figure 12. INDUSTRIAL MODERNIZATION INCENTIVES PROGRAM

Figure 12.

The Industrial Modernization Incentives Program was based upon the recognition that economics was a major barrier to the implementation of new technology in the workplace.

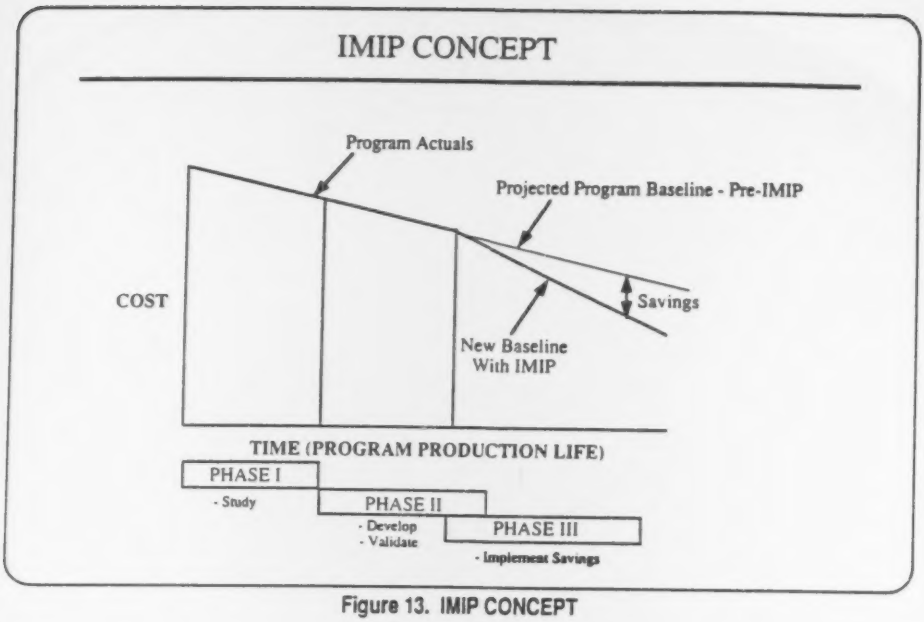



Figure 13. IMIP CONCEPT

Figure 13.

The core of the IMIP strategy is the provision for the sharing of savings generated by the implementation of technology between the contractor and the Navy. This sharing provides the necessary ROI incentive for contractor investment which would otherwise not be made.

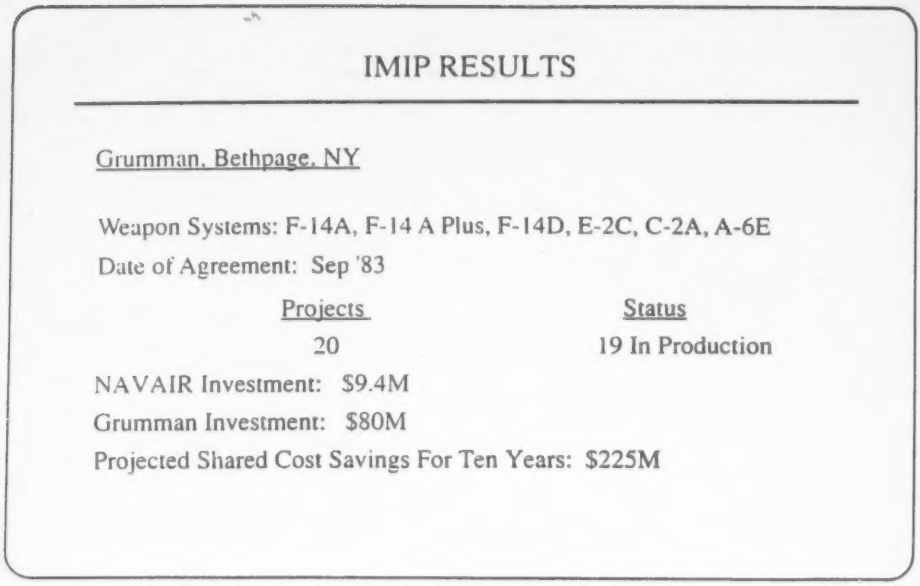



Figure 14. IMIP RESULTS

Figure 14.

An example of the IMIP effectiveness at Grumman is shown in this viewgraph. A total investment by the Navy of $9.4M, leveraged by an $80M investment by Grumman resulting in a cost savings to be shared of $225M over 10 years.

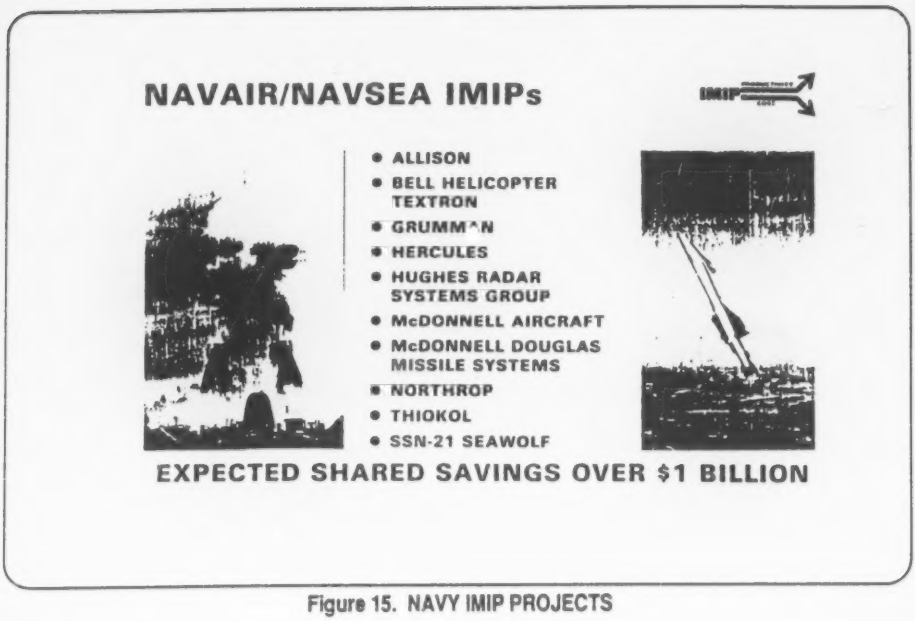



Figure 15. NAVY IMIP PROJECTS

Figure 15.

Currently, the Navy has instituted 9 IMIP projects across a spectrum of contractors.

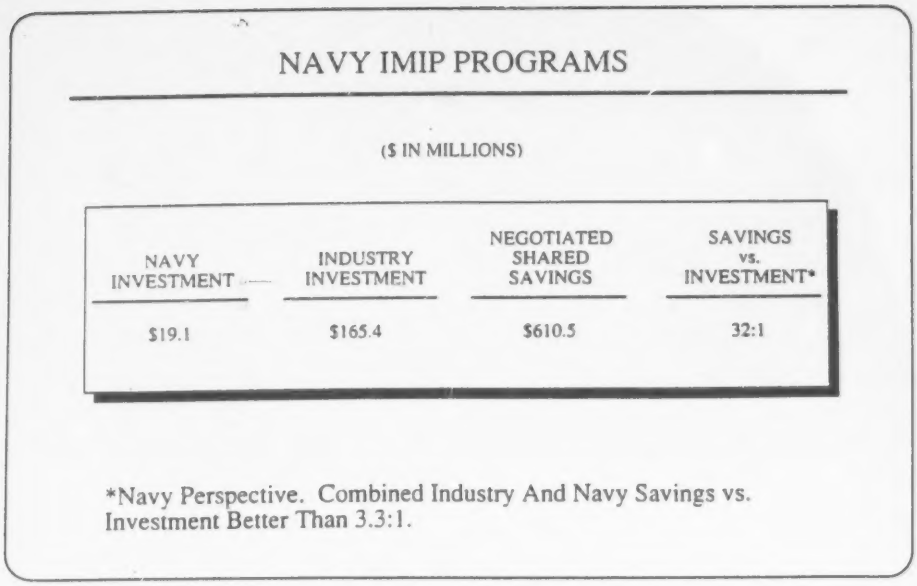



Figure 16. IMIP SAVINGS

Figure 16.

The results to date show a significant leveraging of Navy investment, and a dramatic savings. These figures reflect negotiated, firm contract savings - not projections.

## 12 MAJOR DEFENSE CONTRACTORS*

(Selected Sources and Uses of Funds)

($ IN MILLIONS)

| INCOME SOURCES | 1988 | 1987 | 1980-1988 |
|---|---|---|---|
| U.S. GOVERNMENT | 3729 | 4256 | 32387 |
| CAPITAL EXPENDITURE-USES | | | |
| U.S. GOVERNMENT | 659 | 684 | 7699 |
| BUYING OWN STOCK | 701 | 1545 | 11438 |
| BUY OTHER FIRMS | 474 | 832 | 8624 |

*Boeing, FMC, General Dynamics, Grumman, Litton, Lockheed, Martin Marietta, McDonnell Douglas, Northrop, Raytheon, United Technologies, & Rockwell International

**Figure 17. DEFENSE CONTRACTOR FUNDS USAGE**

Figure 17.

We are evaluating the financial statements of our largest contractors. This chart shows the contracts awarded to our 12 largest contractors and what they did in selected areas with their funds. The largest defense contractors are spending more money to buy their own stock and buying other companies than they are to invest in defense and government work.

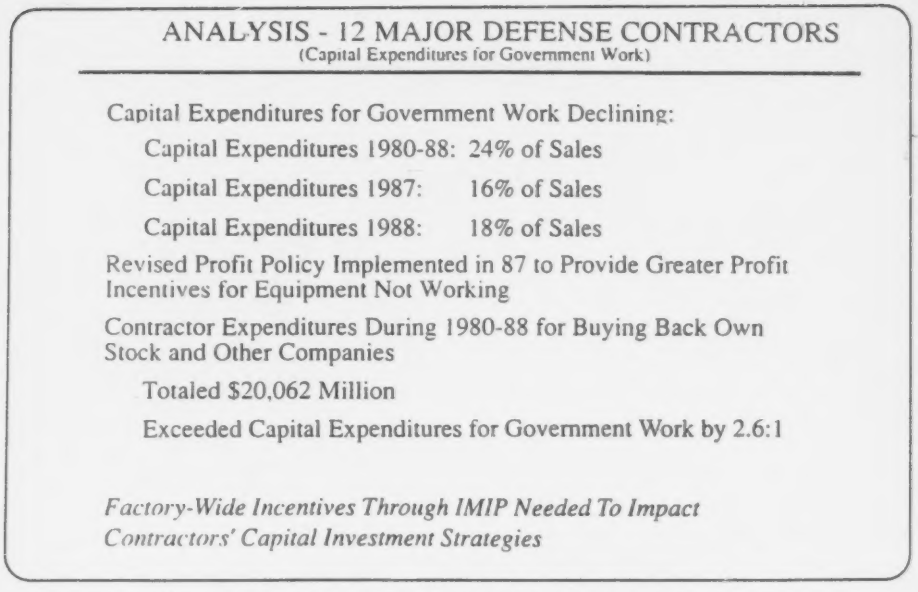

ANALYSIS - 12 MAJOR DEFENSE CONTRACTORS
(Capital Expenditures for Government Work)
Capital Expenditures for Government Work Declining:
Capital Expenditures 1980-88: 24% of Sales
Capital Expenditures 1987: 16% of Sales
Capital Expenditures 1988: 18% of Sales
Revised Profit Policy Implemented in 87 to Provide Greater Profit Incentives for Equipment Not Working
Contractor Expenditures During 1980-88 for Buying Back Own Stock and Other Companies
Totaled $20,062 Million
Exceeded Capital Expenditures for Government Work by 2.6:1
Factory-Wide Incentives Through IMIP Needed To Impact Contractors' Capital Investment Strategies

**Figure 18. CAPITAL EXPENDITURES ANALYSIS**

Figure 18.

Depicted another way, this chart shows that not only are expenditures less for plant and equipment than for buying back stock or other companies but capital investments for defense work are declining as a percentage of sales - a disturbing trend. Companies' investment strategies need to be impacted by a plant-wide IMIP type approach if we are to improve contractor performance while downscaling the size of the defense industrial base. We currently negotiate with defense firms on a plant-wide basis for IR&D and forward price agreements for overhead and it works well.

## NEGOTIATED NAVY SOLE SOURCE CONTRACTS MFG
(Breakdown by Element of Cost)

| | FY88 | FY89 |
|---|---|---|
| MATERIAL | 20.4 | 16.6 |
| SUBCONTRACTS | 50.5 | 37.7 |
| DIRECT LABOR | 8.9 | 8.6 |
| INDIRECT EXPENSES | 11.9 | 15.7 |
| OTHER DIRECT | 3.6 | 15.3 |
| SUBTOTAL | 95.2 | 93.9 |
| G&A | 4.8 | 6.1 |

Material/Subcontracts is Where Money is Being Spent

> 70% Contract Value in FY88

> 54% Contract Value in FY89

Figure 19. ELEMENT OF COST BREAKDOWN

Figure 19.

We also have to impact the capital investment strategies of our subcontractors and suppliers. Currently, the majority of contract value is at subcontractor and supplier level. We can only impact under nine per cent (9%) of the sale at prime level.

## RECOMMENDATIONS

Recognize That Defense Acquisition Is A Technical Process And Requires Technical Management

Develop An Acquisition Strategy Where MANTECH And IMIP Play An Integral Part

Develop Roadmap For Defense Wide Strategy For Integration Of Product And Process Technologies

Promote Centers Of Excellence To Speed The Transfer Of Technology

Employ Advanced Technology And Performance Specifications In Design Process

Take More Advantage Of Commercial Processes And Products

Provide Incentives, Rather Than Regulations To Achieve Results For Prime Contractors, Subcontractors And Suppliers

Increase Funding For IR&D, MANTECH, IMIP And Incentive Related Programs To Enhance Industrial Base

Figure 20. RECOMMENDATIONS

Figure 20.

My recommendations, and I'm sure that you have heard some of these before, involve the areas listed here:

o The acquisition process (technical and contracting) requires the technical management of a technical process in order to make it succeed. We need the best experienced workforce to make this process work to the taxpayer's advantage as our defense involvement is downsized.

o More often than not we are enamoured with product technology (which is important). Equally important, however, is the process technology which determines how we design, develop, fabricate, assemble and test the system. We must develop an acquisition strategy that places equal emphasis on programs directed toward ensuring that our defense industry builds products more efficiently.

o A top down analysis needs to be performed that links product technologies and process technologies. We have not done a good job in the past of developing priorites for where we need to invest resources.

o In order to leverage our resources we must bring together people from Government, Industry, and Academia to solve common problems. We have found that centers of excellence can be very beneficial in accomplishing this goal.

o In order to meet the threat of tomorrow, whatever its scale, we must employ the requisite advanced technology in order to maintain technical superiority. In addition, in order to provide the basis for our defense contractors to diversify -- much like the Japanese -- we must employ performance specifications using commercial standards whenever we can. Furthermore, we must try to adopt commercial products and processes to meet military needs.

o And we must provide incentives, rather than regulations, to achieve our ends. As I recall Senator Bingaman, you were the co-chairman of the steering committee for the landmark report "Deterrence in Decay: The Future of the Defense Industrial Base" which stated:

"The best way for the government to influence the individual sectors of the defense industrial base is not to make excessive demands; instead, it should reward industry for meeting the needs of national security. Industry will perform at its optimum through incentives rather than through regulations."

o Lastly, I believe that it is time to increase the funding for our industrial base efforts. If we make the investments up-front, as our industrial competitors have shown us, that leads to reduced cost in implementation. Our currently industrial preparedness efforts are less than one percent of the procurement budget. If we expanded our efforts here, as our MANTECH and IMIP efforts have demonstrated to date, we will be able to effect greater savings later.

Thank you for giving me the opportunity to address you.

Senator BINGAMAN. Thank you very much. Let me ask a few questions, and then Senator Lott, and then we may have time for another round.

On this last point that Mr. Willoughby made, Mr. Donnelly, let me ask you this.

An issue that we have dealt with here—and we deal with it in the sense that we discuss it each year, but we never do anything about it—is to take MANTECH and IMIP and pull those out of the services and put them in DOD, in the Office of the Secretary, and have them run as a central program.

What is your position on that? Should we go ahead and do that, instead of just talking about it again this year?

Mr. DONNELLY. My answer differs from year to year. But my current thinking is, like I mentioned in my testimony concerning the thrust areas, it is a step in the right direction.

OSD needs to step up to this program and manage it from a top-down perspective. That says, with the services cooperation, we identify the major, overarching thrusts that the Department wants to follow for the next year, 5 years, and 10 years, and then signal to the services, either directly or indirectly, that 80 percent of these two programs is going to be managed top/down. This means if you all really want to play and get dollars, then structure your programs to fall within these major areas that everybody agrees have to be fixed.

Senator BINGAMAN. Could you give us examples of what you mean by these "key" or "major thrust" areas?

Mr. DONNELLY. Examples would be chemical defense; electro-optics; energetics; and propulsion.

Senator BINGAMAN. How would you arrive at those? How do you arrive at these thrust areas?

Mr. DONNELLY. The ones that I was just listing were some of the major areas that we came up with just a few weeks ago, by involving the manufacturing technology people within the Department. It says here is what the experts believe the major areas are.

Now, here is what needs to happen to those thrust areas. They need to be better linked to the 20 technology areas that have just been determined for this year so that there is a match between the two or a good reason why they are not linked. This has to happen next.

Senator LOTT. Before you get away from that—if I might interrupt, Mr. Chairman——

Senator BINGAMAN. Go ahead.

Senator LOTT [continuing]. Let's be specific on one. Let's take optics.

Now, tell me what you are thinking about doing optics and how would they be impacted? I think there are some problems in that area.

Mr. DONNELLY. Well, there are serious problems in that area. I agree with you.

Optics has a significant manufacturing technology problem associated with it. So what we are saying is there is a broad thrust area that needs some attention on the part of DOD to enhance manufacturing processes and techniques associated with optics production. You know, it might be as simple as automating the grinding tech-

nology for disks or something like that. Again, it fits into something where the people say we need to get out in front on the leading edge of technology for these products.

Am I clear?

Senator LOTT. I think so.

Mr. DONNELLY. Okay.

Now, one other piece of this, though, says just because we say something is critical, it should not be axiomatic that the DOD needs to spend dollars on it. If the state of the industry is such that industry only needs to know where we are going for the next 5 years, then the investments can be made. You know, we have to assess what we think is the condition of that sector and whether it will be able to modernize or stay ahead on its own, rather than having Federal support. Just the mere fact that something is critical does not mean, in my view, anyway, that the Government has to spend a dime on it.

On the other hand, there are those cases that are so fluid, yet very necessary, that we see the need to weigh-in.

This list that I was just reading from is more than just 10. There are about 19 there.

Senator BINGAMAN. Let me ask another line of questions here.

We did put in the requirement on asking DOD to identify the industries most critical for application of technologies identified in the Critical Technologies Plan, the idea being that if we have this list of critical technologies and we do not have the industry capacity to actually put these technologies into use, then the whole effort falls somewhat short.

I guess I would just ask you your thoughts as to whether it is possible—and I don't know how these key thrust areas fit into what we are talking about here when we asked for a report on critical industries. But do you see some tie between those three?

Mr. DONNELLY. Of course. Absolutely.

Senator BINGAMAN. Would you explain it to me.

Mr. DONNELLY. I would say first is the 20 Technology Report that we just provided to you last week.

Senator BINGAMAN. Right.

Mr. DONNELLY. The second is our Manufacturing Technology Program thrust areas.

Senator BINGAMAN. Right.

Mr. DONNELLY. The third is the assessment that we will deliver to you this September, which answers the question do we have an infrastructure ready to produce the items that are listed in the 20 Technology Report. I say they are all interwoven.

I would not want to have this misunderstood. These technology thrust areas are not something that we are creating as an alternative. They are something that is being created to make the link between these other two efforts.

I just have to be sure that you understand that, from my point of view, anyway, from Donnelly's point of view, the drill that the Armed Services Committee is putting us through is right on track and absolutely essential. We need to have a good plan that links up the R&D tech base to the infrastructure capability, and this is going to deliver it.

Senator BINGAMAN. Going back to the issue I started questioning you on, and MANTECH and IMIP and whether we should try to centrally oversee those and regulate them, or control them out of DOD, let me ask you what are our options? How would we structure that? Is there some best way or most likely scenario that you could see?

Mr. DONNELLY. Sir, I will tell you what I am thinking about, and I don't have a best way option at this point. But let me give you two or three ideas that I am pursuing along with my associates in the community.

One is the obvious thing that we will do, which is to torque the program into major thrust areas, say, nominally, 80 percent of the projects that are created will be against these 10 to 12 thrust areas, with 20 percent being reserved for the services to continue working on, things that we don't know we don't know.

That, I think, is a given and I think we are definitely going to be able to do that.

Another improvement could be, as you point out, to centralize the funding. Let's put all the dollars in a separate line item under OSD. An example already in place is the Defense Production Act funding, which is a separate line item controlled by OSD. It is a very small amount of dollars, but the concept is central control.

The way that program works is the projects under the Defense Production Act, which are projects to create new capacity, are created through a joint program office, and then the projects go through some thresholds, some criteria, and ultimately are provided to a steering group of flag rank officers from the military departments, and chaired by OSD. And we approve or disapprove the projects at our level.

I don't know whether MANTECH and IMIP ought to be structured that way. That is another way of doing it.

That brings me to the third approach of a joint program office concept, which is really "Donnelly's Dream" at this point. The concept is to take these various tools that we have—MANTECH, IMIP, the Defense Production Act, and maybe a few others—and put them in that type of a joint program office environment, where we could create a synergy among the three services, cut down on any unnecessary duplication and so forth. So that is what we are thinking about.

But step one ought to be to make sure they are properly linked in thrust areas that we can tie to the Critical Technology Report. So that will be done for sure.

Senator BINGAMAN. My time is up. Senator Lott.

Senator LOTT. Thank you, Mr. Chairman.

I appreciate the fact that you are having these hearings. I find this all very interesting. I want to express our appreciation to the two witnesses who are here today and what they have had to say.

In fact, Mr. Willoughby, I was impressed with what you were talking about, in terms of how our education in America is one of our major problems. We are into theory and fundamentals and not design and manufacturing.

This begins in junior high school. Let me put it into more simplistic terminology: we are teaching the people theory, but we don't teach them how to do anything. That applies, I guess, to engineers

and it applies to lawyers. When you get out of law school, you know the theory of torts and property and civil procedure, but you don't know a damn thing about selecting a jury, or voir direing a jury, or trying a lawsuit. I think it just permeates our entire educational system.

If you can get the emphasis on being able to do something, design and manufacture, boy that would be a tremendous accomplishment. I wish we would all pick up on it.

You said when you were asked—and I can't remember exactly what the reference was—but you were told, "well, that's just the way it is." You didn't know whether it was the law or not.

Mr. WILLOUGHBY. Yes.

Senator LOTT. Now that is what I hear in the Senate. Maybe you could help us here in the Senate when you get through with the Navy. [Laughter.]

Senator LOTT. I keep asking, "couldn't we improve the way this place produces or manufactures a product, and why is it done this way or that way?" I just get the same response: well, that's just the way it has always been done.

I used to think when I got these blank stares it was because there was a secret. Then I found out it was because nobody knew. [Laughter.]

Senator LOTT. You know, just look at these chairs over here (indicating). It's a beautiful example. Somebody ordered all these chairs and they were all too low. So then they had to go back and make these cushions (indicating) to make these chairs high enough. [Laughter.]

Senator LOTT. That is off the subject, but I really think the work you have been doing is very commendable.

Now, I know from past experience, as a Member of the House, and in working with some industries in my own district, that there has been an adversarial relationship most of the time, or certainly a lot of the time, between the services and the industry.

With this process that you have been going through, is that beginning to improve? Is it changing? Are we getting a better relationship?

Mr. WILLOUGHBY. From a Navy perspective it definitely is.

Senator LOTT. Well, that is what I am referring to.

Mr. WILLOUGHBY. I could not refer to the other services. But we definitely have a change. I have left out something that I want to call to your attention because this is part of it all.

I commissioned this painting to be made (indicating). We are going to make posters out of it. I would also like to suggest that maybe this could make its way into the commercial sector as well. This is going to be basically a Navy poster. It says, "Quality is an attitude." That may answer all of your questions about why is it this way. You know, they just do not have a good attitude. Their attitude is not right about things.

Senator LOTT. Well, maybe you touched on this, but I know in the past, in the Navy, with regard to a particular area—and I won't name the specific one—because of problems with design, when you got into the production of the ship, you had all kinds of problems. You had change orders and then you wound up having claims before the Navy.

Now, hasn't that dropped off precipitously in recent years?

Mr. WILLOUGHBY. Yes. I don't get involved with claims, but we do see——

Senator LOTT. Yes, but the design problem in my opinion is what leads to the claims.

Mr. WILLOUGHBY. It probably does. But I am not an expert on that. That is way off my field.

What I look at are design changes and things like that. The design change traffic is definitely going down, you know, for a given point in time.

I might point out one thing to you just parenthetically. Design usually always impacts manufacturing. You may not realize it, but designers never make "mistakes." They make "design changes."

People on the manufacturing floor make errors and mistakes. But a designer, no where in the record do you ever see that a designer made a mistake. He made an engineering change. He made an engineering change notice, or whatever they call it. So he gets off scott free.

A good example is Detroit and the automobile. It has never been dimensionalized. Therefore, it becomes a burden down on the manufacturing floor. They have a half-inch hole and a quarter-inch bolt, and they have slots and elongations. Everything is fitted assembly.

You blame the manufacturing people for why your car is not made right. You tend to say that it's not "manufactured" right. Those are the words we tend to use. But a close look tells you that it is not even designed right. That is the basic problem.

We have never dimensionalized the automobile. It is still a fitted assembly kind of thing.

Senator LOTT. Mr. Donnelly, in your statement—and I came into the room as you were giving it—you identified efforts to improve relations with industry through the creation of consortia and public/private partnerships as very important.

Have these impacted positively the acquisition process, or could they?

Mr. DONNELLY. I believe so. I think it is the way to go.

There is another related issue, and somewhat like Will Willoughby, I am going to try to discuss something for which I am not responsible.

The relationship between the Government labs and industry is a good partnership, too. I understand the way that works is the laboratories are not totally encumbered by the Federal acquisition regulations. They are given some room to negotiate with industry without having to meet every clause in the Federal acquisition regulation. That is a good idea as well.

Anything that we can do in a partnership with industry that lets us behave more like a commercial customer, the better off we are.

Senator LOTT. Absolutely.

Mr. Willoughby, I believe you made the point about when industry has as good or a better idea, take advantage of it.

Mr. WILLOUGHBY. Absolutely.

Senator LOTT. I don't think the attitude in the past was to do that. In fact, it was kind of an iron-clad attitude that we are going to go with what our regulations mandate.

Mr. WILLOUGHBY. And, to be candid, I do not think you are still there today, yet. But we are heading that way.

Senator LOTT. This last 10 percent that you are talking about, how long is it going to take us to make a significant impact there?

Mr. WILLOUGHBY. I'll tell you, I think it will be difficult. I say this after talking with the industry.

My problem is that society has made its way into the workplace. You know, society has a motto: "If it feels good, do it."

Senator LOTT. If it feels good, do it?

Mr. WILLOUGHBY. Yes. That is not a disciplined workplace attitude.

When I go out and talk with the people who make their mistakes, we sit down and talk to them. We see the errors. We see what they do. We talk quite a bit.

The burden that society has placed on people I think is going to make that last 10 percent very difficult. It is my estimation that 70 percent of the people who come into the workplace today, be it in the board room or on the manufacturing floor, are not mentally prepared to work, because of the burden that society has placed on them.

I'll talk to some lady and she'll say well, my daughter just ran away from home last night, or my son is on drugs, or always something. They always have an excuse, and you can trace it to societal things. Society is placing a tremendous burden on the workplace.

My personal quest is to have the companies install counseling operations. I have a little private enterprise that I am running with the industry in the Navy, where I am talking to them all to set up professional counseling. I think these people need a lot more help than they used to need.

I always ask myself the question: if my daughter ran away from home, could I do anything the following day that was worthwhile? It would be very difficult.

If you have a look at that burden, you will find that it is very heavy.

Senator LOTT. What good would counseling do with that?

Mr. WILLOUGHBY. Well, sometimes it just lets them get it out. They can talk about it. They can maybe get some advice on what to do, who to see. If they are on drugs, I have asked the companies to send them to drug rehabilitation programs on their own money.

I think our industry has a burden here that it has to bear right now to help our society get back into the right position. These are not things on the agendas. They are just what I talk about with the CEOs and the presidents of these companies. I say, you know, your people are the issue right this minute.

That last 10 percent that I talked about is mostly people issues. It is going to be very difficult to come by unless we, as a society, begin to take stock.

Senator LOTT. You are an expert in this field. But I wonder about your approach. It sounds to me like you are using a typical, present-day societal solution, that is, counseling.

Is there another way? Is there some sort of incentive approach, or, frankly, a stick approach that maybe they would understand better?

Mr. WILLOUGHBY. Well, we have some of that, too. I just don't know how much of that to go into. Some companies have very tough rules on drugs and things of that type, which are very good.

Senator LOTT. But what about the incentives? You know, when you change your contracting processes and you tell people you are going to get a fixed price with an incentive to come in ahead of schedule and under the money, what happens is they come in ahead of schedule and under the money. It also works all the way down to that person at the very bottom and on the front line. You give him an incentive to do more, to produce more, to do better, and they are liable to do it.

Mr. WILLOUGHBY. I, personally—and this is personal—have a concern about incentives only because they can be manipulated.

I have been a part of that in the industry. You can do it a different way and come out with different answers, depending on exactly how you are working it.

When I was on the Apollo Program, for instance, we had incentives on schedule and quality and things like that. One of our contractors was in terrible shape, and yet he got the most incentive money he could get on quality.

It just depends on how you manipulate those programs. I think they should be explored, but I think they have to be done by experts and be done carefully.

Senator LOTT. Thank you.

Thank you, Mr. Chairman.

Senator BINGAMAN. Mr. Donnelly, let me ask you a couple of other questions.

The Defense Manufacturing Board did a 1989 annual report some time ago, I guess, and we still have not seen it.

Do you know what is holding that up or why we can't get that?

Mr. DONNELLY. Not for sure. I know that the report is being reviewed by the Under Secretary for Acquisition.

Let me take that question as an action and take it back with me.

Senator BINGAMAN. If you could try to shake that loose, we sure would like to see what that report says.

Mr. DONNELLY. All right, sir.

Senator BINGAMAN. We would appreciate that.

[At the time of printing, DOD had not yet supplied the report.]

Senator BINGAMAN. There is one other thing that I want to ask you about.

We have an article here from the Washington Post of January 2. It says "Pentagon Plans to Aid Four Ailing Industries." The ailing industries are optics, precision gears, apparel, and food processing.

Would you explain what the nature of that aid is and how this fits in to what we are trying to do here that we were talking about in some of our earlier questions and answers, about identifying critical industries? Some of these do not sound that critical to me. I am not opposed to apparel, but I just don't know that the country's long-term security is going to rise or fall on the quality of the apparel that we have.

Mr. DONNELLY. I am somewhat familiar with that article. I had put it in the back of my mind more recently.

But, if I recall correctly, I think that probably the author of the article had heard about one agency's programs within the DOD, and wrote that up as if that were all we were doing.

I believe all four of those projects are under the Defense Logistics Agency's program. The optical one I believe is closely aligned to a Center of Optics Manufacturing that we think is a good industry consortium.

The gears probably has to do with the Manufacturing Technology Project or a program to improve the process for making gears.

I'm going to have to guess on apparel. I believe it probably has something to do perhaps with chemical protective clothing that is needed to counteract chemical warfare.

The food item, most likely, is MREs, meals-ready-to-eat, which are combat rations.

In the case of the latter two, they are examples of products that obviously have a low peacetime demand and a wartime demand that goes off the charts. It is a difficult problem for us to maintain an industry like that. There is not a big demand for these items in peacetime; yet wartime requirements are substantial.

So I believe in those cases they were trying to find ways to improve the manufacturing process of those products so that they could be rapidly converted in an emergency.

Senator BINGAMAN. I guess my concern, which is probably obvious to you, is it says here in the article that the Pentagon will provide start-up money to help create research-oriented consortia that are designed to get together experts from industry and academia to develop advanced technologies in these areas.

I guess my thought is if, as you indicated before, we are trying to rationalize this process and identify where the critical technologies are and what the critical industries are, to apply those technologies and so on, I do not see that this fits very well in that.

Now, maybe these are also important things to do. But it seems to me that the thing is a little bit "catch as catch can" as to which agency or person happens to get a hearing and gets a chance to plead their case, and they wind up with some money for research into advanced technologies.

Am I wrong about that?

Mr. DONNELLY. I think you are right.

Not all of these might be MANTECH projects, but if you look at MANTECH in general, there are probably 200 or 300 individual projects active at any one time. It probably makes sense to do each one of these projects within its own sphere of influence. But if we don't link them to a larger, over-arching strategy, then we are making a mistake.

Senator BINGAMAN. Mr. Willoughby, let me ask you just a couple of things here.

The courses that you described that are going to be handled now are going to be conducted on design, is that it?

Mr. WILLOUGHBY. And manufacturing.

Senator BINGAMAN. And manufacturing.

Is that just in the Navy, or is that DOD-wide?

Mr. WILLOUGHBY. Well, we are going to make it available to all DOD. It is course material. They can do their own application, but

the textbooks, the curricula, and the teaching materials will be available.

We want to make it available to industry. That is the real target.

Senator BINGAMAN. We had a hearing last year where Chris Galvin from Motorola came in and made the point, which I guess he has made quite a few times, that the Department of Defense could do more for the country by becoming a world class customer than in any other way, essentially. At least that is how I interpreted what he said. I believe he said if we would set standards that industry had to meet which were sufficiently high, then industry would get its act together and meet them.

Is that essentially the kind of thing you are doing? It sounds as though you are doing what industry ought already to have done.

Is it just that we did not demand it of industry before?

Mr. WILLOUGHBY. No. I think it is the issue that I talked about earlier, and that is it is just not available.

You know, we focus on the theory and fundamentals, not on the product side.

Senator BINGAMAN. But you say that it is available on the commercial side, or not?

Mr. WILLOUGHBY. It's not.

Senator BINGAMAN. How does Motorola do it?

Mr. WILLOUGHBY. Well, they do it in certain cases, would be my guess. There is one particular product that has been highly defined, polished, and worked on. It is a very sharp focus type thing. This is done to broadly focus everybody on what these fundamentals are.

I know that Motorola did it, for instance, in pagers, where they dominated the market in pagers. It was done very well, and it was no small task to do. But they did it.

That has more to do with focusing resource and energy on a particular product than just the design effort alone. In other words, there is more to it than that. It is a much broader scope.

I am trying to bring some technology that we used in NASA and Apollo into the workplace where it becomes daily activities and not special activities, not something where only a few people know how to do it—things like that. That is what I am focusing on.

Senator BINGAMAN. My time is up. Senator Lott.

Senator LOTT. I'll pass. Don't we have another panel?

Senator BINGAMAN. Yes, we do have another panel. But I do want to ask a few more questions of Mr. Willoughby.

Senator LOTT. Well, I would like to hear the other witnesses, so I will pass on any more questions for now.

Senator BINGAMAN. Let me just follow up a little more, Mr. Willoughby, on what you have been saying.

What you are talking about, basically, is what you see as some key techniques and information and activities that should be spread throughout all U.S. industry and all the services, and various government activities.

Now, to your knowledge, is there a manufacturing extension program that actually tries to get this out to U.S. industry? You cited your four centers, or your three, soon to be four centers. But that obviously can reach only a small percentage of U.S. industry.

Do you know of anything that is a more broad-based effort to get this course material and these techniques and design activities out?

Mr. WILLOUGHBY. Not that I know of.

Senator BINGAMAN. Any reason that we shouldn't pursue that?

Mr. WILLOUGHBY. No. None. It would be a good idea, as a matter of fact.

Senator BINGAMAN. Okay.

I think we may have some additional questions for both of you as follow-up to the hearing. I think your testimony has been very useful.

We thank you and want to dismiss you and allow the second panel to come forward.

Let's go ahead and hear from Mr. Frank first, and then from Dr. Costello, who can be the clean-up hitter on this panel.

## STATEMENT OF GORDON A. FRANK, DIRECTOR, TOTAL QUALITY MANAGEMENT SUPPORT OFFICE, DEPARTMENT OF DEFENSE

Mr. FRANK. Thank you, Mr. Chairman.

I am Gordon Frank. I am the Director of the Total Quality Management Support Office. The office is part of the staff of the Deputy Under Secretary of Defense for Total Quality Management, Dr. Laurie Broedling.

As you know, the responsibility for total quality was recently elevated. The Under Secretary of Defense for Acquisition directed this change in order to emphasize the importance of the transformation that is required within the Department.

Dr. Broedling had an unavoidable, out-of-town schedule conflict. She asked me to express her profound appreciation for the invitation to appear before you today and your gracious permission to allow me to testify in her place.

In order to conserve time, I wish to summarize and offer to you complete testimony prepared for the record. The testimony has been reviewed and personally approved by Dr. Broedling. It contains our response to your letter of March 20, 1990.

The testimony is intended to outline for you the Department's Total Quality Management strategy, the specific activities underway or planned to establish criteria and metrics for measuring progress, and our plans to leverage accomplishments throughout the communities we serve.

Senator BINGAMAN. That's fine. Is that all the summary you wanted to make at this point?

Mr. FRANK. No. I have a few more paragraphs, if I may.

Senator BINGAMAN. Go right ahead, then.

Mr. FRANK. At this time, we do not seek funds specifically identified for Total Quality Management, although the budget request may include line items for special quality improvement activities, as indicated by some of the previous witnesses.

The key points in the testimony include a definition of the total quality concept, our long-term approach to achieving the cultural transformation necessary to institutionalize it properly, and the way this subcommittee might help us to achieve our mutual goal of a more effective and efficient department.

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Our basic strategy is founded on three pillars. First, we must identify and be responsive to our customers. Second, quality, as defined by the customer, is the number one priority. The third pillar is continuous improvement.

We believe our approach is responsive to the needs of our customers.

Our initial focus is directed toward helping DOD executives understand the concepts and the implementation process. The benefits may not be easily quantifiable or quickly recognized. We ask, therefore, for this subcommittee to help us gain a 1-year period of legislative "benign neglect." In other words, we would prefer not to see the DOD directed toward specific total quality management activities and legislation or conference language. We intend to return next year with a more specific legislative agenda for your consideration.

Senator BINGAMAN. Are you sure we have not given benign neglect to this whole area for decades? I thought we had.

Mr. FRANK. If so, sir, perhaps we are asking for your patience for one more year.

I shall be pleased to try to answer any questions that you or Senator Lott might have.

Thank you.

[The statement of Mr. Frank follows:]

# CONGRESSIONAL TESTIMONY

## GORDON A. FRANK

## DIRECTOR,

## TOTAL QUALITY MANAGEMENT SUPPORT OFFICE

Mr. Chairman and members of the sub-committee, thank you for this opportunity to appear before you to present our views on Total Quality Management within the Department of Defense (DoD). As you know the Deputy Under Secretary of Defense for Total Quality Management has recently been appointed. Dr. Broedling and her staff serve three client communities. First, of course, is the office of the Under Secretary for Acquisition. The second community consists of the remainder of the staff of the Office of the Secretary of Defense, the Military Departments and the Defense Agencies. The third set of clients are other Government agencies and the industrial base which supports the defense effort. Each of these client communities is responsible for adopting a Total Quality Management approach that is responsive to its needs. Our role is to assist them in their efforts, to offer guidance and counsel, to help them to benefit from the achievements of others and to facilitate and accelerate the entire process.

The office is a new one, responsible for broad leadership and overall policy. We are in the process of defining roles and relationships and developing our plans. We support and in turn are supported by offices with related activities. Two examples are the Office of the Assistant Secretary for Force Management and Personnel which includes the Defense Productivity Programs Office and the Office of the Assistant Secretary of Defense for Production and Logistics which includes the Industrial Productivity and Quality Office. Dr. Broedling also meets regularly with executives in each of the Military Services and the Defense Agencies to formulate policy and approaches. We also are networked with the Federal Quality Institute of the Office of Management and Budget, the National Institutes of Standards and Technology, and other Executive Branch Agencies.

As you have just heard, islands of implementation already exist within the Department and the Industrial Base. But we are just beginning the continuing journey toward a new culture, driven by executive commitment and participation, that is oriented to exceeding the quality expectations of internal and external customers. In time, this strategy will result in continuing quality improvements in every aspect of the Department's operation as well as in the quality of the goods and services that we purchase. This result can only be achieved by a team effort whose participants include all of the Executive Agencies, the Congress, and our contractor base.

We hope that through improved communications, we can develop an approach that is mutually acceptable and will earn the support of the Congress. The elements of our strategy include a long term commitment to continuous improvement. We acknowledge that significant gains are possible both from the accumulation of many

modest improvements as well as from major innovations. Our position is that the improvements and benefits will be funded by and reflected in operating and acquisition budgets of individual activities rather than in separate budget line items.

We hope this sub-committee will continue to play a major role in support of our common goal of improving the Department's effectiveness and efficiency. Your understanding of the new approaches to quality have been helpful to our efforts. During the initial period of organization and operation of the Deputy Under Secretary's office, we hope that the Congress would consider each legislative action in the light of whether it aids, is neutral to, or impedes our common interest in Total Quality Management.

In our daily activities, actions are sometimes taken which are sub-optimal. They optimize a portion of the process at the expense of the whole. For example, as individual activities begin to build an awareness of Total Quality Management from the executive level down, it becomes necessary to provide education and training on a variety of subjects. Each organization must determine its own needs. Last year's joint conference report language prevented DoD activities from spending more money on training, manpower, administrative and other overhead resources in support of Total Quality Management than they had spent the previous year. Obviously, an activity that was a late starter in its Total Quality Management involvement and had not spent any money previously in this area was again restricted to zero. This has created serious difficulties.

Other language in the report is similarly troublesome. We do not agree that training must first be provided to employees assigned to industrial activities. Instead, we believe that education and training must begin with the top executives and flow down through the organization. Employees then receive the necessary training on a just-in-time schedule to permit them to apply immediately what they have learned. There is no point in training employees before executive management has developed a vision and committed to a long term strategy for continuous improvement.

The report also requires documentation and verification of claimed savings. While we expect to see gains in efficiency, the real power of the strategy is that it improves the effectiveness of the organization. Quantifying and verifying the benefits of doing the right things will not become easily visible in the short term. One of the clear benefits of Total Quality Management will be an increase in the ability of the Department to engage in strategic planning and our ability to be flexible in response to changing times and changing threats. We anticipate that the metrics associated with effectiveness improvements will vary with the mission and vision of the individual organization and will be challenging to aggregate. We do, however, intend to address the issue.

To demonstrate our approach, I offer the following examples which are being replicated throughout the Department. It indicates the breadth of application of the concepts that we are discussing here today. Within the office of the Under Secretary of Defense for Acquisition a considerable volume of mail is processed each day. The Under Secretary established a senior level team to examine the process and develop improvements in quality and timeliness. Inherent in the approach was the elimination of non-value added work. Three

groups were formed, one to review writing quality, another signature level and the third to consider coordination practices. The results are a reduction of twenty-eight percent in processing time and an accompanying reduction in labor hours.

The Air Force Systems Command reported on their Total Quality Management efforts to streamline the source selection process. In 1987, the average cycle time from the issuance of a request for proposal to an award decision was 175 days; a year later it was 155 days and last year it dropped to 136 days. Some sixty teams are at work across this command to improve the acquisition process and enhance the quality of their weapon systems. Similar activities are ongoing all over the other Military Departments and the Defense Agencies.

Our legislative desires for the overall Total Quality Management approach during fiscal year 1991 is one of "benign neglect." In other words, we would prefer not to see the Department directed toward specific Total Quality Management activities in legislation or conference language. We seek to encourage continuing dialogue at all levels. During the coming year we hope that the bills and conference reports this year will be limited to items that facilitate the free flow of information and will be devoid of impediments to our overall strategy. We do appreciate, however, your continued support of specific programs such as the Industrial Modernization Incentives Program (IMIP) and the Qualified Manufacturers List (QML), which are consistent with the total quality approach. Next year we hope to return with a more specific agenda.

Total Quality Management rests on three basic pillars. First, organizations must be customer driven and customer responsive. We must focus on the customer; meet, exceed, and anticipate customer needs. In the defense environment we have many customers. They range from the internal customer chain inherent in every single process to the external customer who receives the final product. In our view, the most important customers are the soldiers, sailors, marines and airmen who use the equipment and services we purchase. Yet, the ultimate customer is the taxpayer who in the end pays for everything. Second, quality is defined by the customer. Giving the customer quality is the number one priority of the enterprise. This takes precedence over all other considerations, including cost. The third pillar is continuous process improvement. The most effective means for an organization to address customer needs and improve itself is to focus improvement on its processes. Continuous process improvement is never ending because customer expectations continue to rise. The inspection dominant approach is becoming history. Quality design processes and quality manufacturing processes produce quality products and satisfied customers.

Because Total Quality Management is not a program, but rather a different approach to managing an organization, it requires a comprehensive management commitment from the top, education of top management in this approach and, ultimately, personal involvement at every level of the organization. We must get away from the idea of quality as a narrowly defined function with the primary focus on production, inspection and test.

Our goal is to change the culture to one that emphasizes the cross-functional approach to process improvement. The objective is

to streamline every process by analyzing the value added from each activity. Total Quality Management stresses building quality into the process of providing a service or manufacturing a product, and focuses on error prevention, rather than redoing the task until you get it right - thereby eliminating waste. While these concepts were pioneered by Dr. W. Edwards Deming in Japan, they are not unique to Japanese culture. As you know, the concept has been proven in some of the largest American companies -- Ford, Motorola, Hewlett Packard and others, as well as in some of our own organic facilities such as the Cherry Point Naval Aviation Depot, the Air Force Logistics Center at Ogden, and others.

While all Defense Components have begun implementation efforts, Under Secretary John Betti has indicated that institutionalizing Total Quality Management within the acquisition community should be a major priority. We are beginning a specific effort to institutionalize it within the Under Secretary's staff, those thousand or so employees who work for Mr. Betti in the Pentagon. We are starting with executive management education as well as working to define clearly our customers' purpose and values. Then we will develop an implementation plan. In other words we intend to practice what we preach. Other activities include providing guidance and assistance to the DoD-wide implementation effort and working closely with the defense industry to build policies and practices which will encourage their own Total Quality Management implementation efforts. We believe it's crucial that we work on in-house implementation at the same time that we encourage defense industry efforts.

Education is a crucial element in this effort. Implementation cannot be accomplished simply by edict. It is extremely important that the people directly involved acquire the necessary knowledge to effectively carry out the implementation, beginning with top executives. It's equally important that management create the environment that promotes total participation of the work force. We have an explicit educational strategy that is based on the following precepts: top management provides the leadership, vision and resources; course design is flexible and tailored to particular organizations; the cycle of education, training and on-the-job application is never ending; and a broad focus across many skill areas is included.

As a start, we have developed some standard training modules for use throughout the Department of Defense. These modules include Awareness, an introduction to basic concepts and strategies; Group Dynamics, which covers building of multi-disciplined teams; Quantitative Methods, intended as an introduction to the necessary basic statistical tools; Process Action Teams, the application of group problem solving; and a module for facilitators to bring about a transformation in their organization.

We realize that a transformation of this magnitude cannot be accomplished quickly or easily. No bandaid approach can fix problems that are rooted deeply in the way we basically think and operate. We are embarking on a journey that will effect fundamental changes. This will require time.

Implementation cannot be measured with the traditional criteria. We will get an idea of the progress made within each component by the establishment of a Total Quality Management infrastructure, and the

number of processes identified. Then we have to allow sufficient time to get these processes under control and measure subsequent improvements in process performance, time, and cost.

Total Quality Management is not something that can be mandated by contract, since it has to be embraced by the entire corporation. Our focus, therefore, will be on providing incentives for voluntary implementation. Many defense contractors are beginning to learn about Total Quality Management, and we are beginning to receive positive feedback. At least some in the Defense Industry apparently agree that we should not be buying a specific degree of total quality implementation nor should we use the contracting process to direct the way contractors implement it. We recognize that Total Quality Management should be integral to each company's basic approach to remain competitive and sustain business viability. We do not intend to include contractual "how-to" requirements for plans and data items nor do we plan to monitor company-wide implementation during contract performance.

There is ample evidence that suppliers who have implemented Total Quality Management are in a position to provide higher quality products and services and improve value to their customers. To recognize such achievements and to continue to foster these improvements, we plan to make it a factor in source selection. The DoD is currently preparing draft guidance and a recommended approach. We are working closely with the industry associations to develop this concept. We hope to use a combination of the Malcolm Baldrige National Quality Award criteria, reduced somewhat in scope and detail, and the offeror's past and present performance to help us select the best source. We are working with industry associations in this matter.

Prior policy statements and practices have identified fixed defect levels as potentially inhibiting quality improvement since they imply defects are allowable. Accepting nonconforming materials is not consistent with our current quality philosophy or policy. A Joint-Service/Agency Process Action Team has been formed to determine the most effective approach to remove fixed defect levels of acceptance criteria from military specifications. The concept is one of creating a focus on evaluating the manufacturing process and its ability to minimize variability and eliminate defects rather than rely on end-of-line inspection as the basis for acceptance of materiel.

How difficult is winning the Malcolm Baldrige National Quality Award? In 1988, the first year of the competition, sixty-six U.S. companies competed for the six awards -- two each for large manufacturing firms or their divisions, two for small businesses, and two for large service companies or their division. Only three won: Motorola Inc., and Westinghouse Electric Corp.'s Commercial Nuclear Fuel Division as large manufacturers; and Globe Metallurgical Inc., in the small business category. No service company was chosen from the nine entries.

In 1989, forty U.S. companies competed. Only two won: Xerox Corporation's Business Products and Systems and Milliken and Company as large manufacturers. No awards were given out for small businesses and large service companies despite seventeen entries. The

decrease in entrants is not due to a lack of interest. More than 51,000 copies of application guidelines were distributed in 1989 compared with 12,000 for 1988. The drop-off has been attributed to the realization by many companies that their quality practices were not yet worthy of consideration rather than the complexity associated with the application.

The defense industry has played a significant role in the national quality award procedure. Some defense contractors have already applied. We hope their example will be followed by others. In addition, some of the directors and trustees of the Foundation for the Malcolm Baldrige National Quality Award are executives or directors of companies that are defense contractors.

Thank you again for the opportunity to present to you our strategy for Total Quality Management. We look forward to working with your sub-committee to capture the opportunities we see before us.

Senator BINGAMAN. Thank you very much.

Let me call on Dr. Costello to go through his testimony, or summarize it, or whatever he would prefer at this time.

## STATEMENT OF HON. ROBERT B. COSTELLO, SENIOR FELLOW, HUDSON INSTITUTE

Dr. COSTELLO. Thank you.

I had presented a little paper I had put together before looking at one series of actions by the Defense Department dealing with dual use. I would like to have that entered for the record.

Senator BINGAMAN. We will include it.

[The paper referred to is attached to submitted testimony.]

Dr. COSTELLO. But I would like to make a few other comments, if I might.

We have in the United States an infrastructure in engineering, science and manufacturing—and I want to emphasize this—that has been the envy of the world—has been.

It prevented, without firing a shot, what would have been the costliest, bloodiest battle in the world. The Russians capitulated. Anyone today who can casually stand by to see it wither, poorly used, or atrophied is absolutely wrong.

I stood by an Apollo facility in Milwaukee, Wisconsin, where a bucket loader went through and destroyed the infrastructure that we put together to handle the Apollo Program. I think there are some people that think the best way to handle any change in the industrial base today is to go in the plants and turn off the lights. We cannot afford that. We have an infrastructure that is the envy of the world. We need to redirect it so that it can provide the industrial deterrence that is so key.

This is what "won the war."

The Russians still remember the convoys of ships that unloaded gear, and they think we can do it again. At that time, we were probably building close to two ships a day. In 1994, we will be lucky to build 15 ships in a year. This means the infrastructure is totally different and cannot support even the leadership the Navy talked about with their readiness with the new ships.

Those are tough remarks. But I think we ought to focus in on that and ask what is the real deterrent. The real deterrent is not weapons that we can't afford. The real deterrent is the threat that we can bring to bear resources that no other nation in the world has ever been able to do, and we have done it in the past.

I would like to focus on a couple of issues.

Mr. Willoughby mentioned organization. We have talked about TQM. The organizational structures that we must have are interactive, not independent and noncommunicative organizations.

We talk about the leadership for program management in the Navy, the Army, or the Air Force, and we want to have technical professionals of some kind. If you talk to an engineer, he has to be an engineer. If you talk to an accountant, he has to be an accountant. If you talk to—and I hate to say this in these terms—to a "procurement weenie," he has to be a "procurement weenie," with a major strength in how to buy things.

What we really should be talking about is outstanding managers running programs, because it is called "program management." Many of the program managers that we have had in the past, military backgrounds included, have been sought out by industry to be managers outside.

It is not program managers, I think, that are the major problem.

One of the things we happen to be expert at is to continue to change the organization, to shuffle the deck, so we don't know who is in charge or who to blame, and we can say that we are reorganizing again to adjust and direct our attention to this area.

The Government has to be a catalyst. Sometimes that catalyst involves technical activities. With TQM, it says that DOD has to be a catalyst in this management activity of continuous change/improvement. Dr. Broedling's new assignment acknowledges the effort in Total Quality Management, the concept of total process improvement on a continuing basis.

But I also think the absence of the Under Secretary, or the Deputy, or the Secretary himself at forums in which some of the issues that we are talking about are discussed. Not having that visibility on the outside world says that maybe we are not as committed to these changes as we might have been.

It takes top-down commitment and overwhelming evidence of support in something as broad as TQM because it involves not just the technical things that Mr. Willoughby was talking about but the entire structure and the way we do things.

I did not hear mention of a program called CAALS—computer aided acquisition and logistic support. This is the key program for the United States, not just for the military. CAALS was a program that was started and supported by the Department of Defense and it deals with digital data development from engineering all the way through the entire support system and logistics activities.

The country that has digital data and a digital data distribution system has a degree of flexibility that no other competitor might have. To give you an idea of what the digital data world can do for you, I visited Japan in December, and I saw the demonstration of digital data engineering activities that dealt with nuclear power plants. With digital data, the company was able to give the engineers a tool they didn't have before. They were able to model the

entire plant and walk the customer through a tour of the plant. Then they actually sat there and simulated the assembly, the construction of the entire plant—in 3-D, on large screen TV. It was almost on a high-definition TV, too, by the way, which we may get to, also, today.

The end result is that with all that sophistication, they were able to save 25 percent of the cost of the plant. I don't see us doing that today.

I did not hear us mentioning that Secretary Carlucci and I said that we could save between $25 billion and $50 billion per year by changing the way we do business. I think we need to set some very strong goals so that we can monitor the performance of the actors achieving those goals of substantial cost reduction and changing the ways we do our business.

The Department of Defense for years has built a cocoon around itself in which they have protected themselves from the real world.

It was indicated that Chris Galvin said you could do a lot if you are a world-class buyer, or a world-class customer. We need to have the intelligence put into place to establish that world-class customer category.

With the investment that we have of maybe a trillion dollars or two putting this infrastructure together, by not challenging the real world around us we have programs today, such as VHSIC. VHSIC refers to the very high speed integrated circuits. Eight years into the effort, an investment of a billion dollars or so there is still no significant use of the technology in the field by major programs.

And yet, Mr. Chairman, you can go down to your local K-Mart store or one of the electronic shops and buy a VCR or a PC or any of the other advanced electronic devices that use VHSIC capability in the commercial world.

The concentration on product technology that we have listened to has to be balanced with the appropriate manufacturing capability. Concurrent engineering is key.

Now, I realize that the administration did away with the Defense Manufacturing Board and married it, again, with the Defense Science Board under the guise of concurrency. But the Defense Science Board had had that responsibility for some 20 years and they had ignored it—because they are product oriented, science oriented, and not manufacturing oriented. That is the major reason I decided, when we put it together, to separate it off, to give significant focus to the issue that you in this committee meeting are looking at today.

I touched on the concept of dual-use capability in the paper that I presented to you. The Europeans, the entire European military-industrial complex, is focusing primarily on those activities that have commercial spin-off. If it does not have significant commercial value, you will find them very, very reserved in their support of it.

The Japanese, on the other hand, do not have any defense-oriented activities. They have a spin on to defense from the commercial base. Defense cannot afford to support the unique infrastructures that they have grown to control and protect. To be a world class customer, you have to really understand where you are and how you are measured against the rest of the world.

One of the ways we looked at dual use was SEMATECH. Some of the people thought it was subsidizing industry to support SEMATECH. I would like to give you my perspective.

We needed, in the Defense Department, four key things in the semiconductor industry. We needed to have low volume capability. That means you couldn't make a million of them to get just 10 good ones. We needed to have high technology, advanced state of the art. We needed to have high quality, because they had to be reliable, and we couldn't make a million to get 10 good ones again. And we had to have a flexible manufacturing system.

The experience I had in the Defense Department was if we had gone out for contracts in those four areas, it would have cost us at least $100 million a year in each of them, and they would have been separate, independent activities, not integrated. We put SEMATECH together. We brought the experts in each of those fields together to do the work that we needed to get done in the Defense Department.

It was fortuitous that it also met the requirements of the commercial industry as well. And we were able to do this with a total cost of $250 million, of which the Defense Department paid about $100 million.

This is leverage. My perception is that it was subsidy, all right. Industry was subsidizing the needs of the Defense Department, and we leveraged our dollars very effectively. It might even be good at this time to take a look and expand the efforts of SEMATECH, look at a longer range goal, so that we can truly produce the processing necessary to be leaders in that world again for the United States.

Dr. Noyce, who is the President of SEMATECH, was invited to come to some meetings that we are having in Indiana in May, talking about the industrial base. He said, Bob, I'd really like to, but I have to go to Washington to protect our interests, and I am going to do no other travel but to go to Washington to see that we can ensure the continuation of SEMATECH.

That is bewildering to me.

DOD has to change, and there has been some progress made. But it still appears that they may still be shuffling that deck of cards. It is time that we put together the best resources from industry and academe, working with the Government as a catalyst, to look at ways to allocate the resources, the funds that we have, so that we do not continue to support weapon systems that were not cost effective before Mr. Gorbachev made the significant changes in Eastern Europe.

We might want to take a page out of history. Secretary Laird, when they had the workdown from the high level of activity during the Vietnam war, cut major programs. He increased R&D. I'm sure he would have focused a great deal of that R&D today on industrial competence and leadership in manufacturing.

Now, I do have a few items that are specifics that I think we might want to look at.

Number one on the list looks at industrial intelligence. Having been on the receiving end of a lot of questions from the Senate staffers here, we can't even tell you how dependent we are on foreign procurement, let alone tell you where foreign technology is

leading. During the discussion today we heard about DINET and SOCRATES. I already thought I had directed that they be consolidated and joined.

Even if they are, it is a very small effort because in SOCRATES, I think they had seven people assigned to that very important, intelligence monitoring of the industrial activities. I think we have tens of thousands of people looking at tactical and strategic targets.

Next I might want to stabilize the activity in DARPA and expand its scope, so that every time they come up with a program, they have to take a look to see how much it is going to contribute to the industrial base on which we depend, or whether it is going to perpetuate that defense-only cocoon that I think may be counterproductive today.

Next, while I was still in the Defense Department, I did force them to give you your list of critical technologies. But that is only a list, and that is one perception of what the critical technologies are. If I had been you, I would have asked for the funding profile for the next 5 years and what milestones we might have set in place to measure our progress against, because I think if they are critical technologies, we had better have some specific programs in place to follow up on them.

Some comments were made, again by Mr. Willoughby, so I think I may have to send him a copy of a report that Secretary Carlucci had on his desk and signed off on, a report dealing with streamlining Defense Department's standards and specifications. In that report, everyone, not just program managers, were authorized to use industry standards as a base, and they would have to carefully and fully justify a defense-only specification and standard.

I have some problems with the goals that we have in mind. Even if we look at the goal for the Navy, that is a 45 percent effective Navy when he reaches his goal. I do not think that is adequate.

If we look at some of the goals for the products that he is working on, we started with a 2 percent defect as an acceptable quality level. But that is two parts in 100. He wants to go to one part in 10,000. The rest of the world, including the electronics world in the United States, led by Motorola, happens to be going to a six sigma environment, in which we are talking about a few parts per billion, which happens to be 10 million times better than what we have been doing, 100,000 times better than Mr. Willoughby's goals.

I don't think we are looking at world class in the right context, and we had better do some good homework.

Now, if that has not stirred some adrenalin in some of the people who may have been listening—and I wish the others had stayed—maybe we can send them a copy of the testimony and ask them what they are doing.

I will be glad to answer your questions.

[The prepared statement and additional paper of Dr. Costello follows:]

**Testimony**

**presented by**

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## THE ROLE OF THE GOVERNMENT IN STRENGTHENING THE INDUSTRIAL BASE

The issues focusing on industrial competitiveness, the role of government, and free trade have been thoroughly and exhaustively discussed. The perceptions range from "ain't nothin wrong, so there ain't nothin to fix" to "the sky is falling, the sky is falling." Now, if one takes the stand that we can do better in this world of international competitiveness and we should get on with it now, then perhaps adherents to both of the schools could work together in defining proactive roles for government, industry, and academia, that would truly enhance the opportunities for American industry to maintain its leadership in productivity and technology. During the Senate Banking Committee hearings, in July 1989, on the reauthorization of the Defense Production Act, Senator John Heinz, R-Penn, made the comment for the record that anyone in this or any other administration who believes that we do not have industrial policy in the U.S. is wrong. He went on to say that we have hundreds of policies -- deficit governmental budgets, deficit trade, environmental laws, etc. -- and they are neither consistent nor strategic in nature. I proposed at the same hearings that we carefully define our needs for a series of consistent, coherent, strategic policies that will allow the United States to use its industrial resources and those of our trading partners to enhance our leadership in productivity and technology. Yes, in shorthand, industrial policy, those two terrible words that you cannot avoid.

Industrial policy is not simply an act of picking winners and losers. In the proper context, industrial policy is a sophisticated series of interactive, strategic activities encompassing industry and government when working together can promote continued increases in the standard of living for its citizens in an environment in which global competitiveness and the expectations of the rest of the world can be appropriately addressed. Fostering protectionism would, in itself, assure failure. What is needed is a

new relationship in which both industry and government take on new roles working together in partnership outside the sum zero games of one winning at the expense of the other.

There are some recent examples that deserve discussion at this point: Sematech and the National Center for Manufacturing Science. When Sematech was first proposed, it represented the traditional approach of protection and subsidy. The U.S. was falling behind in the manufacture of dynamic random access memories -- DRAMS -- and the industry approached the Department of Defense to subsidize the manufacture of 1 megabyte devices and commit to purchase the output. A special Defense Science Board task force study supported this original proposal even though 1 megabyte devices were already available in the marketplace, with 4 megabyte devices soon to follow. Fortunately, the Sematech idea evolved from a subsidy of obsolete manufacturing capability to an industry-government partnership to aggressively pursue new manufacturing technologies. Sematech, a consortia to enhance U.S. capability to make a wide range of semiconductors -- one, four, even 16 megabyte DRAMS, advanced microprocessors, and input/output devices -- is now a model for others to follow. What made Sematech successful was (1) a focus on process and manufacturing technology instead of on specific products; (2) the specific needs of DoD which meant well-defined requirements for high quality, low cost, low volume production capabilities to meet the needs in space and sophisticated weapon systems. These goals could only be achieved by implementing radically improved manufacturing capabilities. It was and is fortuitous that the same improvements in manufacturing technology would significantly increase the ability of the U.S. semiconductor industry to compete in the global market as well.

Consortia are subject to much debate. If Sematech is successful and all the Europeans and Japanese think that it is and still want to join, why wasn't U.S. Memories able to find support for the effort to manufacture advanced memory devices which are now a Japanese dominated market? In this specific case, the Memories consortia had chosen to direct their energies to play "catch up" with traditional technology and designs. The effort was not devoted to new technologies or unique advantages that would have allowed the members and the users to leapfrog the competition. By the time the product was fielded, the competition would have been in the field with either the next or

following generation of devices -- 4, 16, or 64 megabyte devices. Sematech had chosen other goals -- the development of new basic manufacturing and process technologies that all of the industry could use. It might be an additional challenge to Sematech if it too were to work on Memories, but with an approach to manufacturing biological or some type of organic memory with vastly increased capacity at lower costs.

Was Sematech to be an isolated incident? No. The same concepts were applied to forming a consortium for the machine tool industry. The U.S. machine tool industry, the product of entrepreneurial leadership, was once dominant in the field. In the 1980's, world competition seriously eroded the U.S. lead. It was difficult for this industry in particular to accept the concept of working together in partnership -- partnership with your competitor. When the industry leaders finally agreed that they could do together what they did not have the people nor financial resources to do alone, the consortium -- The National Center For Manufacturing Science -- was formed. Now, 80 to 90 machine tool manufacturers and their users are working together, sharing ideas, and benefitting from a partnership similar to those that their foreign competitors have enjoyed for years.

The optics industry offers yet another example. For several years the Joint Logistic Commanders have stated the needs for vigorous research, development, and manufacturing in optical system design and manufacture. It is no surprise to anyone that the U.S. optics industry has not remained competitive in the market for years. Today state and federal governments, industry, and academia have formed another consortia committing resources to meet the international challenge in advanced optical systems.

Consortia with government and industry working together may be only one of many new ways of doing business. They provide a unique opportunity for restructuring mature industries and for encouraging the growth of emerging technologies. The United States is unique. The Department of Defense, the largest single customer in the free world, has needs for advanced technologies to maintain the technological edge in the world for peace. DoD can put in place critical manufacturing capabilities that can serve to develop the commercial/industrial markets as well. Working together, government and industry can both benefit from the exploitation of the unique dual use technologies and put the U.S. in commanding leadership

The U.S. can exploit the concept of dual use technologies -- military and commercial -- better than any other nation in the world. Expand the concept of defense to encompass the real deterrent -- our industrial capability -- in allocating funds. Use the Defense Research Projects Agency (DARPA) to explore the multitude of key programs that can benefit U.S. global competitiveness. Use the infrastructure that has been built over the last 10 to 20 years at a cost of a trillion dollars or two for our overall benefit. We cannot afford to destroy it, nor can we continue to support it as a unique infrastructure for defense only. No one could afford to duplicate what the U.S. has. The scope must be expanded to encompass emerging dual use technologies that will leapfrog the U.S. into the lead again. HDTV -- high definition TV -- is not a subsidy of Zenith Electronics. It is an appropriate digital display device for the military to interconnect sophisticated intelligence monitoring capabilities for use in the field to plan real-time assaults. Think of the power the local field commander would have with detailed real-time knowledge of the location of all the adversary in his next -- today's -- target from the multitude of remote sensing systems, satellites, manned aircraft, and unmanned drones. The army with that integrated interactive information system will win the next confrontation. Isn't it fortunate that the same comprehensive integrated digital interactive network will also propel its developer and user into the commanding position in world trade.

Unique new partnerships, consortia, and joint ventures are a way to do what the U.S. has not been able to do through the traditional free market approach. It is not picking winners and losers in the traditional sense, but rather picking a set of coherent consistent policies together with a combination of manufacturing and product skills that will allow the U.S. participants to achieve and maintain global leadership.

In those instances in which there have been successful approaches to improving U.S. competitiveness, a new way of government and industry working together has been introduced. Voluntary Restraint Agreements -- VRA's -- have been implemented in several industries with varying degrees of effectiveness. The extremes may best be described by how well they worked in the steel industry and how they were misused in the auto industry. In the case of the steel industry, the government provided some time for the companies in the industry to restructure, reinvest, and implement significant change by limiting the level of imports. The steel companies and their major users -- the

customer -- effectively used the time to focus on correcting the problems within their industries in ways that they had not done before; new ways to doing business for all concerned. In the auto industry, the constraint on imports was only used to improve corporate profitability -- marginally in the U.S., but dramatically in Japan. In this case, the user/customer was not part of the team and he/you lost. New relationships and new ways of doing business will be the norm for the successful company. We must manage change more effectively and keep the customer on the team.

## Dual Use Technologies—Everyone Wins

By Dr. Robert B. Costello, Senior Fellow, Hudson Institute

The viability, the strength, the image of our industrial base has gained more significance over the past few years. Not many expect the same outpouring of equipment that buried our enemies in World War II. But, today, our ability to maintain our outstanding technological leadership is the key to our strategic planning. We have already suffered erosion of our leadership in some areas, and we must reestablish that leadership through aggressive new approaches.

The kind of initiative needed has been demonstrated in the government's support of Sematech—the consortium of key semiconductor suppliers working together to rebuild the U.S. position in semiconductor manufacturing—and the National Center for Manufacturing Science (NCMS)—another consortium for users and manufacturers in the critical machine tool industry. In other areas the United States has been able to maintain leadership—the critical military and commercial air frame industry.

Of immediate concern is the definition of the role of government—not just the Department of Defense alone—in fostering and supporting efforts for U.S. leadership in emerging technologies. As late as the early 1970s, Defense played the major role in many of the emerging technologies. Today, DOD has a role significantly different. It now is a participant in the development of key emerging technologies, not the lead player—or the only player—as in the past.

This changed environment is best illustrated by the electronics industry, where Defense led the development of the integrated circuit industry and is now less than 4 percent of the market. The role of Defense has changed in just about all other industries as well. In the early development of computer-controlled machinery, Defense funded the programs and was in the lead. Today it finds itself as a user of the more advanced concepts of flexible machinery centers that have been developed for commercial use, often with foreign technology and manufacturing. Most of the advanced semiconductor equipment critical to the development and manufacturing of very high speed integrated circuits is of Japanese origin today—developed without any DOD funding. The role of the DOD has changed, but the concept in acquisition strategy has not been modified to adjust to the realities of the new environment.

DOD investments in Sematech and NCMS are not subsidies of the industrial base. They represent tile catalyst necessary to establish the broad industrial and governmental support for reinvigorating these key industries. With only few exceptions (radiation hardening and stealth technologies are two good examples) are there technologies in which the DOD is the dominate user. Even the unique leadership in combat shipbuilding, so vital to the Navy, cannot be maintained for long without a viable commercial maritime industry—in which the defense segment might no longer be dominant.

Defense acquisition strategies must be modified so that our R&D resources which exceed $20 billion a year are used to leverage the technological leadership in the broader commercial industrial base. In this way, the benefits of increased R&D in the commercial sector can be leveraged with Defense dollars to the benefit of both efforts resulting in significant U.S. leadership and international competitiveness.

A good model for the new role of Defense in funding emerging dual-use technologies is certainly high definition television (HDTV). There is a wide variety of unique applications in defense from cockpit displays to maps and unique real-time mission simulations that demand HDTV capability. Without broad commercial use

of this and other supporting technology, and concurrent capabilities in design and manufacturing, the DOD may not have the money to bring this cost-saving technology to fruition. Only through a commitment to working with industry and other government agencies can this emerging technology be captured for Defense use, while establishing the United States as a leader for commercial exploitation worldwide as well. The associated capabilities in advanced semiconductors and a national digital interactive communication systems for the 21st century will grow from this dual-use, dual-funding investment in the future. Defense can not do it alone. Industry must have the defense market as a critical mass to leap ahead of the rest of the competition.

Defense plays a unique role in leveraging commercial R&D and providing the critical initial market volume in emerging technologies. No other nation has the resources or the structure to establish technological leadership in such a dramatic direct way. HDTV is perhaps the model, but similar approaches should not be far behind for superconductivity in electronics and electric propulsion for ships, trains, and industrial users. Direct involvement of the DOD in accelerating commercialization of emerging dual technologies is a winner for everyone—the consumer, the taxpayer, and Defense.

Senator BINGAMAN. Thank you very much.

Let me ask first, Mr. Frank, one of the comments Mr. Willoughby made was that he thought TQM should include the kind of thing he is talking about, and that part of the Total Quality Management Program should incorporate these upgrades in design and manufacturing.

What is your own definition of TQM? Does it include any of that or is that someone else's job?

Mr. FRANK. We see TQM as a management culture with quality as the answer, if you will. Total Quality Management is the process by which we manage. When Mr. Willoughby talked about the improvements that were made in design and manufacture, these are improvements to the process.

The first step in any of these activities is understanding the process. That is a fundamental tenet of Total Quality Management.

I see no quarrel with what Mr. Willoughby has done in the context of Total Quality Management. I think those are elements of Total Quality Management.

Senator BINGAMAN. I am not suggesting that you would see a quarrel with it. But I am just wondering if you see your office as having responsibility to proliferate and promulgate the kind of work that he has done.

Mr. FRANK. Absolutely—and more, if I may.

We see this as only one element of the total problem. The acquisition process is a process that, as Dr. Costello has just suggested, also needs improvement. The design process is a process that needs to be improved.

These are all elements of the overall top-down Total Quality Management Strategy.

Senator BINGAMAN. Do you know if the kinds of instruction that he is testifying to today, that will be based on these Bell Laboratory documents, is something that is going to be done DOD-wide? Is that something that your office would have some responsibility for?

Mr. FRANK. I don't know whether we would specifically undertake to assume that responsibility from Will's shop. I am sure that we would do whatever we could to facilitate their use throughout the Department.

But I think, as in some of the other initiatives that have been taken by Mr. Willoughby, he would continue to manage them on behalf of the Navy, joined by the other military departments.

Senator BINGAMAN. Dr. Costello, let me ask you about manufacturing extension.

One of the things that we are struggling with this year is whether the Department of Defense has some useful role it can play in manufacturing extension, in taking the kinds of things that Mr. Willoughby presumably is talking about in these design techniques, manufacturing techniques, but also not just instructing people in the general area, but actually working with the private sector to try to upgrade their manufacturing processes.

Is that something that you think we can do through the Department of Defense?

I know there are some isolated examples where we have done it. Maybe there are more than I am aware of.

Is this a problem that this subcommittee even ought to be thinking about, or is this someone else's job?

Dr. COSTELLO. I think that any of the studies of the industrial base issues that are before us say that education is key.

We cannot have a strong deterrent unless we have a strong industrial base. Defense has to be interested, and there are examples where they have done work of this type.

If you would query Senator Levin, we were able to support the expenditure of some monies to provide machine tools for training specific skilled technicians in the use of advance computer flexible machining centers in a program in Detroit called "Focus Hope."

You can do these things, and you should. We did undertake those kinds of things and we still can undertake those kinds of things in the Defense Department.

They have a real need. They have in statute a requirement to see that those things are done.

Senator BINGAMAN. Let me ask this. On the Defense Manufacturing Board, you indicated your reasons for having set it up separately, and your general dissatisfaction with the decision to, once again, terminate it, I guess, and fold it into the Defense Science Board.

What do you think, if anything, Congress ought to be doing to try to promote a focus on manufacturing in a way that will actually get something done? We are very good at legislating things that remain dead letters, even after they have become law.

Is there something that we could do that would be constructive and would actually bring the kind of attention to this area that it deserves?

Dr. COSTELLO. To get the listener to listen to you, you have to have some clout. The Defense Department is the largest single customer in the entire Free world.

When you spend the kind of money they do, you have lots of clout.

This is one way they can play the role of a catalyst to focus attention on the critical issues of manufacturing. The customer is often the driving force.

There are many organizations being looked at, associations of groups of people getting together to try to do the same kind of thing.

There is an organization in Michigan called ITI, Industrial Technology Institute. It was funded by the Kellogg Foundation. They have been trying for 4 years to figure out how to get people to listen to them, to put in place advanced technology.

When I was in charge of procurement for GM, they listened to me because I spent $50 billion or $60 billion a year. When I moved to the Defense Department, they listened to me three times as much because I spent three times as much.

I think the Defense Department has a role. But I don't think they really understand the mission that I think is theirs of strengthening that industrial base so that they have the resources available to them in case there is an emergency.

So, what they can do is to improve the level of technology available and the management skills available—that was one of the reasons we supported the National Center for Manufacturing Science, a machine tool consortium that was working with the machine tool industry to do much the same kind of effort that you are describing here.

Senator BINGAMAN. Let me ask you about this effort that we engaged in also while you were with the Department, about trying to require the identification of critical industries, as well as critical technologies. We are sort of treading into new ground here because we are trying to step in and cause the Department of Defense to come back and tell us those areas of industrial activity which they ought to be particularly concerned about.

We will have to see what we get by way of a report later on this year.

But I would be interested in any thoughts you may have, Dr. Costello, on the appropriateness of us inquiring about that, and on other things we could do to bring attention to that. The issues of critical technologies and critical industries begin to intertwine in the case of semiconductors, for example. You have the semiconductor industry, and I think we could not be running SEMATECH and putting $100 million taxpayer dollars in there each year if we did not have tied to that a concern about the long-term future of the semiconductor industry in this country. Then people would have a legitimate question as to why we were funding all that research.

In fact, we do have the industry still sufficiently robust that it participates and points the direction for and benefits from the research.

Do you have thoughts about the appropriateness of us pursuing this critical industry issue?

Dr. COSTELLO. I think it is important that the Federal Government develop a strategy and a consistent series of policies that will allow us to use the industrial resources of the United States to enhance our technical and our productivity leadership. In shorthand, it says "industrial policy."

We have a lot of them today, and they are often contradictory in nature.

The product leadership and manufacturing technology leadership are intertwined.

When the Defense Science Board made its study of the semiconductor industry, it came back and said to subsidize the manufacture of one megabit dynamic RAMS. That is exactly what they said.

When I was first approached with that, I said no. Subsidizing a product of that type will lead to obsolescence. Besides that, I can already buy one megabit dynamic RAMS, so how about four megabit or 16 megabit RAMS. But how about the essential tools for the semiconductor industry so that it doesn't make any difference whether I make dynamic RAMS or microprocessors or input-output devices of a wide variety.

So you come back—and let's focus on manufacturing—so that we can not only have the brilliant challenge of a very effective product, but the wherewithal to make that product in a real world.

It does not do us any good to have designed and developed—I hate to do this now—B–2 bombers that we can't afford because nobody can buy enough of them to make them an effective deterrent, because we did not figure out how to make them economically, cost effective.

The two of them should have gone very closely together. VHSIC should have been introduced much earlier because we would have had a generic technology that would have allowed us to make any kind of semiconductor more rapidly if we had said semiconductors are a critical technology.

The reason I bring up the B–2 is because composite structures are a critical technology. The advances in the aviation industry will stress the advantages of a composite structure with extremely high stiffness and strength. This can only be achieved with composite structures of various types.

It is easy and rational to go through a series of industries and say this manufacturing know-how and capability and those products are intertwined. They are essential to the deterrent that we must maintain.

I think Senator Lugar challenged me the other day with a thought that he put on the table. We are the world's only superpower today, and we have to look at our role very, very carefully in maintaining that industrial capability that allows us to be that superpower. The Soviet Union is no longer a superpower, and there is nobody to replace them right now.

We are the only superpower.

Senator BINGAMAN. I think that may be true. But I would suggest that in technology, maybe there are two, soon to be three.

Dr. COSTELLO. There are real challengers, for sure, in technology.

Senator BINGAMAN. I think the Japanese are certainly capable and the Germans are coming on strong.

Let me ask either or both of you about the Malcolm Baldrige Award. It has been suggested to us that one way the Defense Department could begin to instill greater concern for quality in the contractors that do business with it is to use that competition in some way or other to encourage firms or maybe even require firms to apply for the Malcolm Baldrige Award at some stage, if they are going to continue to do business with the Department of Defense.

Is that a reasonable kind of suggestion, or is that something that makes no sense?

Mr. FRANK. At the moment, my understanding is that we are planning to use the Malcolm Baldrige Award criteria, perhaps limited somewhat, as one of the evaluation elements for source selection, such that we begin to move from a cost point of view to a value point of view, and that we consider the quality aspects as demonstrated by the contractor and his ability to satisfy the Baldrige criteria.

My understanding is that this would not be accompanied by any kind of contractual requirement or plans that would require a contractor to satisfy us in terms of the Malcolm Baldrige criteria during contract performance. This would all be part of the source selection activity.

We would see these capabilities existing, and that would be heavily weighted during source selection.

Senator BINGAMAN. So you are saying that rather than require people to apply for it, just take those same criteria and build them into the acquisition process?

Mr. FRANK. Yes, sir, the source selection process.

Senator BINGAMAN. Dr. Costello.

Dr. COSTELLO. If I read the testimony correctly, it said that they were going to modify the Baldrige Award to meet certain defense needs. I question whether we should modify them. I think they are outstanding criteria. It was put together with a study, a comprehensive study, by a wide variety of people, both in industry and government, and in academe. The Baldrige Award criteria I think are outstanding.

I think the Defense Department has to take a more aggressive role. If passive, it will happen some day if we keep asking people about it. That's one way to do it. But we think if you are out there, aggressively pursuing some level of active participation on the part of the contractor, it will happen a lot faster. It's proactive versus reactive. I think they have to be out front. I think they have to be leaders in the introduction of their criteria.

I am not willing, and, in fact, when they started the program I said let's not make it a specific textbook/cookbook criteria that you have to meet and do on a check-off sheet, because it involves fundamental ways that we change management's look at themselves. They have to accept the responsibility for changing their organization.

I think the Defense Department has to get out in front and be a catalyst for change.

Senator BINGAMAN. Dr. Costello, let me ask you what I was asking Mr. Donnelly earlier, about the advisability of directing that MANTECH and IMIP management and control be centralized in the Office of the Secretary of Defense, instead of left with the various services.

Is that something that makes sense, or is that just reshuffling the chairs?

Dr. COSTELLO. You may be just reshuffling the chairs again. It should be done through the services with their active participation with their contractors. If you take the MANTECH and separate it out as over here it is part of the Defense Department, OSD, then you may not have the full support of the people who actually run the contracts, buy the programs, and pay for the programs.

So I think that MANTECH has to be directed, supported, and monitored, with a strategy put together by OSD. The implementation of the program should be aggressively pursued in the services themselves.

I think one of the reasons we see differences in MANTECH is the Air Force did a good job. But the Army and the Navy decided they could spend their money elsewhere, and that they were "subsidizing industry again."

The Air Force took a leadership role. I think that leadership role has to be through the other two services as well, through their entire acquisition process.

Senator BINGAMAN. How do we bring that leadership role about in those other services if we don't put more authority to control the money in the Office of the Secretary of Defense?

Dr. COSTELLO. I never needed any more authority than you people gave me when I took the job. I didn't need to have the purse strings. I had a review and said, what are you doing and why aren't you doing more? I said, let's go visit a plant, let's go visit a contractor, let's go visit a contracting agency. Let's see what you are doing. With that kind of visibility, you don't have to hold the purse strings.

What happens with separation of the money is that they all say well, you own the money, you do the job. And the Office of the Secretary of Defense does not have the resources to do the job. You have to work through those other people, and it is effective to get it done that way.

Senator BINGAMAN. But do you support the idea that Mr. Donnelly had of identifying 10 to 12 key thrust areas—I guess that is the phrase he used several times—and requiring that the majority of the money be spent in those areas?

Dr. COSTELLO. I think that is appropriate.

I would get the people from the MANTECH programs—Army, Navy, and Air Force—together in one room, sit down and with participation agree on technical approaches and establish an agenda with milestones and funding.

This way they can have the appropriate-level service review in establishing policy.

Senator BINGAMAN. Could you do that by setting up a central, coordinated office where all the services are represented, and have a central location from which these programs are run, even though the services retained some authority over those that they manage?

Dr. COSTELLO. I'm not sure if you're talking of a physical location. I'm not sure that that is totally required. But, in many cases, the idea that Dick Donnelly had of a joint program office could be very appropriate.

I think it is his office, actually, that has the policy reins and direction.

Senator BINGAMAN. Okay.

We may have additional questions of both of you as time goes on. If so, we will certainly call on you.

Again, we thank you for your testimony. I think it has been very useful.

Thank you both very much.

Dr. COSTELLO. Thank you.

Mr. FRANK. Thank you, Mr. Chairman.
Senator BINGAMAN. This subcommittee is adjourned.
[Questions for the record with answers supplied follow:]

QUESTION SUBMITTED BY SENATOR SAM NUNN

Senator NUNN. In fiscal year 1989, Under Secretary Costello approved the recommendation of the Defense Logistics Agency (DLA) to establish a "service contract" arrangement with Survival Technology, Inc. (STI), the principal U.S. supplier of chemical warfare antidote auto-injectors rather than rely on sporadic Stock Fund requisitions from the services. In fiscal year 1990, this decision was reversed by the Deputy Under Secretary for Industrial and International Programs. In fiscal year 1991, it is uncertain whether DLA orders for this item will be sufficient to persuade STI to remain in this business.

Are you concerned that absent a "service contract" approach, DOD risks having STI cease producing this item?

What would be the implications for our chemical defense program if STI dropped out of this business?

Mr. DONNELLY. The risk to the U.S. national security would not be appreciably increased if STI ceased business operations. The remaining competitor is a European headquartered firm with domestic operations that use domestic subcontractors to provide components for the finished product. Further, the European firm provides most of the nerve gas antidote to the personnel of our allies' military forces. The U.S. Army has been testing a new mechanism to provide nerve gas antidote that looks promising and may supersede the existing treatment system within the next 2 to 3 years. From an acquisition perspective, we would prefer to see competing firms capable of meeting our needs; however, we recognize it is not always feasible.

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QUESTION SUBMITTED BY SENATOR JEFF BINGAMAN

Senator BINGAMAN. Last November a General Accounting Office study, "Industrial Base: Adequacy of Information on the U.S. Defense Industrial Base," pointed out that a point Army/Census Bureau program to collect information on foreign sourcing as part of the Survey of Shipments to Federal Government Agencies was never carried out. What plans does DOD have to carry out this information collection as part of the next survey?

Mr. DONNELLY. In fiscal year 1987 the Department of the Army provided the Census Bureau $100,000 to expand the 1987 Survey of Shipments to Federal Government Agencies to include data on foreign vulnerability. The Office of Management and Budget did not approve the data collection form on the grounds that the survey was excessively burdensome. As a result the form missed the window to be included in the normally scheduled 1987 Census Bureau 5-year Economic Survey. Additional money was needed to conduct the survey in 1988 as an independent effort rather than as a part of an existing Census Bureau Survey. Money was withdrawn in September 1989 because of a lack of progress on the independent effort. The withdrawal was accomplished with the intention of pursuing an effort to include the proposed questions in the normally scheduled 1992 Survey of Shipments to Federal Government Agencies. The Army is currently undergoing a 1 year test of procedures which, if successful, will result in a contractual commitment to do industrial preparedness planning. Included as part of that effort is a Production Capacity Survey Form, DD Form 1519 (Test), which contains questions on foreign sourcing. This form is only used to obtain data from firms that choose to conduct industrial preparedness planning with the Army (or other services) and would thus not be as encompassing as a Census collection effort. The availability of dollars and a review of the scope of the foreign sourcing data required will determine if the 1992 Census Survey is pursued.

[Whereupon, at 4:00 p.m., the subcommittee adjourned, to reconvene upon the call of the Chair.]

# DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1991

TUESDAY, APRIL 24, 1990

U.S. SENATE,
SUBCOMMITTEE ON DEFENSE INDUSTRY AND TECHNOLOGY,
COMMITTEE ON ARMED SERVICES,
*Washington, DC.*

## IMPLEMENTATION OF THE DEFENSE MANAGEMENT REPORT IN REVIEW OF S. 2171, AND S. 2440, THE DEFENSE MANAGEMENT IMPROVEMENT ACT

The committee met, pursuant to notice, at 9:37 a.m., in room SH-216, Hart Senate Office Building, Senator Jeff Bingaman (chairman of the subcommittee) presiding.

Committee members present: Senators Bingaman, Nunn, Levin, Glenn, Gore, Wallop, and Cohen.

Committee staff members present: Arnold L. Punaro, staff director; Andrew S. Effron, general counsel; Madelyn R. Creedon, counsel; and Geary T. Burton, counsel.

Professional staff members present: Robert E. Bayer, David S. Lyles, Michael J. McCord, Frederick F.Y. Pang, and William H. Smith.

Minority staff members present: Jonathan L. Etherton and Ronald P. Kelly, professional staff members.

Staff assistants present: Barbara L. Braucht, Melissa Ann Ramsey, and Mickie Jan Wise.

Committee members' assistants present: Kenneth N. Luongo, assistant to Senator Levin; John Gerhart, assistant to Senator Bingaman; Leon S. Fuerth, assistant to Senator Gore; Terence M. Lynch, assistant to Senator Shelby; Melvin G. Dubee, assistant to Senator Byrd; James M. Bodner, assistant to Senator Cohen; Robert M. Soofer, assistant to Senator Gorton; Charles G. Pearcy, assistant to Senator Lott; and Eric H. Thoemmes, assistant to Senator Coats.

### OPENING STATEMENT OF SENATOR JEFF BINGAMAN, CHAIRMAN

Senator BINGAMAN. The subcommittee will come to order. The subcommittee meets today to receive testimony from the Department of Defense on the legislative initiative, the Defense Management Savings Act, and on the implementation of Secretary Cheney's Defense Management Report.

We welcome Deputy Secretary Donald Atwood, who has the enormous task of managing the internal affairs of the Department, including the streamlining efforts that grow out of this Defense Man-

agement Report. He is accompanied by the Department's Comptroller, Sean O'Keefe—we are pleased to have you here—and General Counsel Terry O'Donnell. We are pleased to have you here as well.

I think the presence of these three senior officials underscores the Department's interest in this area. We look forward to working with them on these legislative proposals, which are quite voluminous.

Since the Defense Industry and Technology Subcommittee was formed in 1987, we have taken a keen interest in trying to streamline and simplify the acquisition system. In 1987, we noted in our report that the procurement system is suffering from regulatory overload as a result of the number and scope of recent regulations and legislative changes.

In 1988, a legislative package was sent forward by the Department, but unfortunately it was thin. Then Under Secretary of Acquisition, Robert B. Costello, referred to the Department's proposal as "pablum" that year. I think that was his view of the matter. We did try to pass some legislation this last year in response to requests from the Department of Defense, but again, I think we fell far short of the kind of comprehensive effort that was considered to be needed.

Much of the package we have received this year involves minor management adjustments to the military and civilian personnel statutes, but there are a number of acquisition initiatives that have the potential for significant reform, but of course which are likely to prove quite contentious here in the Congress.

It is my expectation that we will give each of these items a full and fair hearing with a view toward enhancing the Department's ability to streamline the acquisition process. If the controversial items are to have any chance of legislative success, it is essential that the Department present a clear and well-documented case for the changes.

For that reason, Senator Wallop and I wrote to Secretary Cheney on the 15th of March requesting the Department provide a detailed analysis of the proposed legislation, including a description of the problems identified in current law with specific examples where possible. We have not yet received a response to that request, apparently as a result of problems encountered by the Department in negotiating clearances of the legislation with the Office of Management and Budget (OMB).

Whatever the reasons, further delay is certainly a problem. I hope the Department will be able to devote the necessary effort to develop the documentary support that is needed for each of these proposals.

Secretary Atwood, one of the overriding themes in presenting the package concerns the need to provide DOD with greater freedom to operate as a commercial enterprise, and one of the most important steps we took last year in this regard was to provide DARPA with broad authority to enter into innovative, cooperative research agreements with private firms as well as government entities.

This last Friday, it was reported that Dr. Craig Fields, the Director of DARPA, was removed from his position reportedly, at least in part, for exercising that authority which we granted last year. Obviously, we have concerns about this. We can hardly expect pro-

gram managers to exercise the freedom of action contemplated by this legislation, or by the legislative proposals that you are presenting here, if the overriding message is that innovation is not acceptable.

We hope we have not come to the point where people are removed from positions for following the laws that we pass—a situation that obviously would have a chilling effect on legislative proposals before us.

In your remarks, I hope you can address first the removal of Dr. Fields from DARPA, which has been a concern to many of us here in the Congress; and also, your view of the role that DARPA and the Defense Department should be playing at this time in areas such as that where we granted authority last year.

Let me elaborate just a little. As the immediate military threat recedes, many of us have the view that our focus needs to become more long-term and needs to be more on maintaining our long-term capability to meet potential threats. That obviously, in my view at least, means a broadened definition of national security. It means concentrating greater attention on our technology base, greater attention on industrial base issues.

There have been a series of events in the last year which have been of concern to me in this regard, actions by the Department. The decision to terminate the Defense Manufacturing Board was one. The widely-reported rumors that there was lack of support within the Department for continued funding of SEMATEC was another. The decision by the Department to cut back on research funds for HDTV was a third, and now, of course, last Friday we have the termination of Dr. Fields.

I think the reason that they concern me is that they raise the real fear that while many of us are looking for a broadened definition of national security, perhaps some in the Department, yourself and others, may have a different view. You may feel that in a period of contracting budgets we should be doing just the opposite and narrowing our view of national security, putting our funds only in those things which result in immediate military capability. If that difference of opinion exists I would like to explore it some at our hearing today, because I think it is a concern that obviously will underscore much of what we do here.

I know there are other members who have statements they want to make. Let me defer to Senator Wallop for an opening statement, and then if there are short opening statements by other members who are here, we will be glad to hear them as well, but we do want to get on to the witnesses. Senator Wallop.

Senator WALLOP. Mr. Chairman, thank you. I will be brief.

I am really delighted that today we are able to begin serious consideration of the efforts by the Department of Defense to implement the recommendations of the Defense Management Review.

On April 5—no secret—Senators Nunn and Warner introduced S. 2440, the Defense Management Improvement Act, at the request of the administration. If enacted, the legislation in this package could have a significant impact on the management of personnel, property and defense acquisition.

I will say that nothing frustrates me more than the current system of procurement, which provides not only the expensive com-

plication and impediments to efficient procurement, but also an excuse for not doing better.

The primary concern of this subcommittee is with Title II of the legislative package, which addresses improvements to the acquisition process and includes 18 separate provisions. The provisions would provide DOD relief from congressionally-mandated requirements and restrictions on the purchase of goods and services. Some of the proposals in Title II will be controversial.

For example, section 202 on commercial style, acquisition practices and the similar pilot program for major systems acquisition in section 217 will require us to review the policies behind the legislative and regulatory requirements that are the candidates for waivers under these sections.

The Department of Defense must be prepared to demonstrate the impact of these sections on specific provisions of the law, and the analysis will not be easy and will require as much effort from the Congress as from the Department of Defense.

Nonetheless, as Secretary Cheney has pointed out, we cannot hope to make lasting changes unless both the Defense Department and the Congress act as partners in removing every redundant layer of regulation or oversight. DOD must be as thorough and decisive in eliminating its own, internally-generated regulations, as we in Congress must be ready to change our internal procedures or to repeal or modify legislation. Both partners have to be willing to put everything on the table.

So Mr. Chairman, I hope that today's hearing will be but the first of several hearings on the implementation of the Defense Management Review recommendations. We must examine the policy issues raised by the DOD proposals and provide opportunities for all the players in the process to give us their views, but most importantly we must move this process with all deliberate speed so that we can act on as many of these proposals as possible before the end of the year.

Thank you.

Senator BINGAMAN. Thank you.

Let me just say in response, I do believe the subcommittee will have to have at least one and probably two more hearings on this package of legislative proposals before we will be in a position to act on them.

Let me now just defer to the other subcommittee member who is here today before we call on the other two committee members joining us. Senator Gore.

Senator GORE. Thank you very much, Mr. Chairman.

I realize that the subject of this meeting is not the firing of Craig Fields from his position as head of DARPA and that the witnesses are technically here for other purposes. Nevertheless, this meeting is the first opportunity any of us have for comment about this event as members of this committee rather than as individual Senators.

I attempted to contact Mr. Atwood on the telephone immediately when I heard that this was in prospect, he was traveling and I was unable to speak with him. I think it is a very serious mistake.

Everything we have learned from the proceedings of the last 2 years points to the continued erosion of the defense industrial base

upon which the national security will depend in the future. Of course, that is only a derivative of the larger process of erosion going on in the Nation's overall industrial base.

In a sense, there is some futility in trying to deal with a lesser problem when it is symptomatic of a greater one, but the industrial defense base is an area of public concern that falls to us on this subcommittee. All the trends we have observed and documented in the defense industrial base have existed despite a period of relatively high expenditure on military goods. We can only expect, therefore, that the decline of the defense industrial base will be accentuated by the sharp cuts in military spending on the way, not only in our country but in Western Europe, which has been a major market for our defense industries.

In general, we are agreed that the time has come when military spending can and should be cut, even though we disagree on some of the scale and proportions of these changes. I think we are, however, unanimous in our belief that a strong defense industrial base is vital to us as a hedge against the tremendous uncertainties and risks our country still faces.

One of the forms of industrial activity that has the highest significance for defense and for our technological future in general is the field of electronics. Our leadership in this field depends upon the fate of the semiconductor industry in the United States of America, but the fate of the U.S. semiconductor industry is itself determined by developments on an international scale in the global marketplace.

In that marketplace, we have been doing very poorly. The same is true of our domestic market, and of course the troubles in each relate to the same root causes, many of which we have discussed here time and again.

Here we have an industry of the greatest strategic and economic importance to the United States of America. We have an industry that is simultaneously in deep trouble. And yet, this is the only major government in the entire world that has no strategic concept whatsoever for responding to this challenge.

Enter Craig Fields. He is not a political ideologue. On the contrary, he is almost the perfect apolitical civil servant—highly intelligent, unusually objective, and rational. He clearly understands his job is to make sure that the Department of Defense continues to have access to the very best technology for defense purposes.

He sees clearly that as the U.S. production base in semiconductors withers away, our access to this kind of technology will also be at risk. Yes, we can purchase it from others, but only if they permit us to.

And who can say what circumstances will prevail in the future, affecting the willingness of others to permit us access to technologies vital to our national security and industrial well-being.

And so the logic of his situation forces Dr. Fields to ask whether anything can be done to block this erosion. Of course he is not in the right place to mount a full-scale strategy, but there are certain things he can do, and he does them.

However, in the process, he runs afoul of the views of politically appointed superiors in the Department of Defense, in the Treasury, in the White House, and probably in the Office of the U.S. Trade

Representative, who hears entreaties from companies in Japan and elsewhere who wish to provide all of the key technologies we need now and in the future.

Their view is that nothing should be done to offset the decline of the semiconductor industry and that the Nation should rely upon the marketplace alone to correct the problem, and upon the continued goodwill of our trading partners ever more to compensate for it. It irritates them to have an upstart civil servant quietly pointing out that in the real world, defending the Nation requires the services of certain kinds of industry. And that in the end, you either have it or you do not.

It infuriates them that this same civil servant keeps on using his lawful authority in ways that run counter to their political will and their prevailing ideology.

And so they fired him. And I am told they have threatened his staff. Nobody has gained but our military enemies and our economic competitors. It was a bare-knuckled assertion of authority and political control.

In my view it is a disgrace to the Government and an immense loss to the defense of this country.

Thank you, Mr. Chairman.

Senator BINGAMAN. Thank you. Senator Glenn.

Senator GLENN. Thank you very much, Mr. Chairman.

I want to commend you for convening this hearing and for all your efforts to ensure that the DOD procurement system provides the weapons and infrastructure needed by the Armed Forces. I particularly appreciate your invitation to all of the Armed Services Committee members to attend this subcommittee hearing today, because we do have great interest in it.

I have very few preliminary comments on the Defense Management Review proposal, particularly the procurement changes in S. 2440, which seem to be essentially to let DOD act as a commercial entity.

Now a commercial entity is fine, and the responsibility to a bottom line is there, but we also have the accountability required when we deal with taxpayer dollars. And those do impose a very large additional burden.

Changes would be made in these accountability rules, basically, with the legislation proposed. For example, section 217 asks us to allow the Secretary of Defense to take six large acquisition programs and waive "any provisions of law or regulation."

Now presumably this would allow waiver of the Competition in Contracting Act, waiver of all bid protests to GAO, or other bid protests forums, such as the Armed Services Board of Contract Appeals (ASBCA) and perhaps most importantly the waiver of small business and minority contracting requirements. And that is a pretty big request when we get to that.

Section 202, the commercial product section, would allow all government procurement agencies to replace current GAO or General Services Board of Contract Appeals protests with a procedure of raising complaints in an agency-level protest system whose procedures and safeguards are as yet unknown.

I have yet to see justification for this provision. We will be looking very carefully at those facts which DOD can supply to support these proposals.

I am also concerned about section 204, which would allow for contract awards without discussions or negotiations pursuant to a newly proposed standard where such awards will provide "the greatest benefit to the United States." Now all Federal contract awards should provide the greatest benefit to the United States.

But such a standard appears at first blush to be unreviewable and hence unchallengeable. In addition, such a standard carries within it the means of undermining CICA's requirement of full and open competition. I have no disagreement with overruling the narrow problem created by the GAO opinions which claim agencies cannot make awards except to the lowest cost vendor without discussions and negotiations of some kind.

Section 206 seeks to change a provision of the Office of Federal Procurement Policy (OFPP), requiring the Deputy Under Secretary for Acquisition to serve on the Federal Acquisition Regulatory Council. The idea behind the FAR Council was to bring the top acquisition officials of a number of agencies of government—OFPP, OMB, NASA, GSA (General Services Administration), and DOD—together to solve important problems which cannot or should not be routinely resolved on the bureaucratic level.

Two years into the implementation of the law, there has been one such meeting. So the requirement has not proved to be too onerous. Despite that, DOD continues to object because they want to send a lower level official to such meetings.

Many of these procurement proposals, particularly those that are government-wide, are written in such a way that they also fall under the jurisdiction of the Governmental Affairs Committee. And I look forward to making the necessary arrangements to ensure that both committees' needs are considered when the legislation comes before us.

I shall hasten to add there are several procurement proposals here that may indeed be very fine policy and be good policy. For example, I think section 205 makes sense in its attempt to simplify and reduce the number of specific dollar thresholds. I want to hear more from the IG, the Inspector General at DOD, and I am coming to the belief that it may also make sense to raise the Truth in Negotiation Act threshold so long as data and certification can be required in certain cases.

Briefly, the proposals which appear in Title IV of the bill would have the effect of diverting half of the substantial sum of money from Treasury to DOD when the Government property DOD is using is sold or leased. This would mean the base closures, if we sell off certain bases, half of that money would remain with DOD.

Now I have very strong reservations with some of these provisions. For example, why should DOD be treated differently from every other agency in this Government with respect to such properties? Should all agencies have the right to have 50 percent of whatever is sold out of their Department?

While some financial reward may be appropriately provided to induce efficient behavior, at first glance, this proposal appears to go too far.

Finally, let me conclude by saying that this proposal, the whole bill, covers a number of other areas which are of particular interest, especially when I change my Armed Services Committee hat for, I guess we would say, a pith helmet they issue to me as chairman of Governmental Affairs, but Title III proposes changes dealing with civilian personnel matters.

Some of these changes appear to have merit and should be considered for enactment. For example, Governmental Affairs Committee action has already been taken on the relocation benefits proposal. Section 303 of the DMR bill and my civilian pay reform bill, S. 2274, addresses additional pay for employees in remote work sites contained in this bill in section 306.

I am concerned about other proposals which I believe need to be studied carefully before any action is taken on them. For example, DOD proposes the repeal of the 180-day waiting period for employment of retired military members in civilian positions, and offers no safeguards against returning to the abuses that caused Congress to enact these revolving door restrictions in the first place.

I am concerned that lacking some oversight or control mechanism, the services could return to the spoil system that existed in the past.

Mr. Chairman, I am very sympathetic to the purpose of the legislation and what it is trying to do, and I look forward to getting into the details of it in the questioning period.

Senator BINGAMAN. Thank you very much. Senator Levin, did you have a statement?

Senator LEVIN. Thank you, Mr. Chairman.

Let me also welcome Mr. Atwood and his colleagues here this morning.

I, too, have a number of concerns with the proposal. There are parts of it that I think could be workable, but my predominant reaction is one of the type of concerns which others have mentioned here this morning, including Senator Glenn.

This proposal contains sweeping exemptions from existing procurement legislation. And most of those provisions were aimed at protecting taxpayers from waste or from poor quality items. My deep concern about that, the sweeping revisions, is exacerbated by the fact that the Department has not used existing authority that it now has to implement certain programs which would create some streamlining and some savings.

And one very good example of this is a commercial products program which was part of legislation which we sponsored in the DOD Fiscal Year 1990 Authorization bill. And I am afraid this is a good example of what part of the problem is. We had hearings on the Department's efforts to remove internal impediments. These are not the regulatory overload which Congress has placed upon you, but internal impediments to the acquisition of commercial products.

As we know, when commercial products are used, they generally save huge amounts of money, and yet the Department has had to be pressed to use commercial products. There are all kinds of internally placed impediments to that.

You and I have had many conversations about this, Mr. Atwood. You pledged to devote more of your efforts to the commercial products issue. You established an ambitious agenda for addressing it.

A year later we still have the same number of OSD staffers looking at it—two people. Although a commercial products directorate was under consideration back in May 1989, no such office has been created. The two low-level staffers who are working on commercial products have to go through five layers of bureaucracy before they can even reach you.

The Department recently took 4 months to respond to a letter just asking for the status of the efforts to address the commercial products issue. That was a letter which was addressed personally to you, Mr. Atwood.

Last summer the DOD set deadlines of November and December of last year for five specific actions. And I will not detail them, but they were important actions relative to increasing the use of commercial products, which is one of the things you are addressing in this management plan.

None of the five actions promised last November and December have been completed. The commercial products handbook that was scheduled for issuance in December has been postponed, this time until May. That one was promised by the end of 1988, by the way.

The directive that was supposed to be improved and upgraded on commercial products acquisitions apparently is going to be canceled instead.

Now these are things which can be done by the Department without Congress acting. But, in addition to that, of course, we have the problem that what you are asking Congress to do here is just a sweeping revision of procedures which we have put in place to save taxpayers' money and to improve the quality of goods.

We were faced with waste and with non-performance. We tried to tighten up the ship in the procurement area. We thought DOD bought too many products without competition. We passed the Competition in Contracting Act a few years ago. It resulted in a dramatic increase in the amount of competition, which saves huge amounts of money. That act would be waived, as I understand it, under the proposal for these five major programs.

We were faced with products that did not perform too often. We legislated much more serious testing requirements. Those testing requirements, as I understand it, from this general proposal, would also be waived.

It is going to take a very carefully documented, very carefully crafted proposal from the DOD, I hope, before we consider waiving these kinds of provisions which have been put in place as a result of what we saw in the procurement process, which was too often wasteful spending and products which did not meet specifications or did not do the job.

I do not think the Department has told us yet what specific problems it has. That has to be documented. It has to tell us what these statutes would be replaced with. We have asked, as I understand it—the chairman and Senator Wallop have asked—for documentation which has, as I understand it, not yet been forthcoming, for whatever reason.

The Department has not yet identified the statutes that it would waive. We need that rationale very much.

So again, given the procurement history of the Department, I do not think the American people are willing to sign a blank check, be it a check for dollars or a regulatory check.

On the other hand, just to end with a positive note, I think there are parts of this proposal that we should work on with you, but it is going to take some very careful documentation and it is also going to take a determination on the part of the Department, at least in my book, to use the authority that it has now to achieve some of the goals which it has set for itself in this management review.

Thank you, Mr. Chairman.

Senator BINGAMAN. Thank you.

Secretary Atwood, as you can see, there is less than unanimous agreement on all the things that have been proposed and done. We welcome you, though, as a representative to explain these proposals and we look forward to your testimony.

**STATEMENT OF HON. DONALD J. ATWOOD, DEPUTY SECRETARY OF DEFENSE; ACCOMPANIED BY SEAN O'KEEFE, COMPTROLLER, DEPARTMENT OF DEFENSE, AND TERRENCE O'DONNELL, GENERAL COUNSEL, DEPARTMENT OF DEFENSE**

Mr. ATWOOD. Thank you, Mr. Chairman. When I came to Washington a year ago, no one ever said it would be easy.

As you know, just about a year ago we presented to the President our Defense Management Report, which addressed many of the problems that Congress had talked about for some time, and that have been plaguing the average American citizen.

They were addressing the fact that people in general felt that the Department of Defense was too large, it was too complex, it was too burdensome, and it was too immovable to make the kind of efficiency, improvements that were necessary in order to save the taxpayers dollars. It was compounded further by the concern, as a result of Ill Wind, that there was widespread corruption within the Department and within industry.

This Report addressed a number of provisions which were aimed at fixing those problems. Since that time, we have made a number of substantive changes, changes which have led to a further disciplining of the acquisition system to ensure that programs and products and weapons that do not pass rigidly-enforced milestone points do not proceed from concept to demonstration and validation, to full-scale development and on into production. A number of programs have been halted as a result.

Beyond that, we have taken a series of steps which we reported on last January to consolidate like functions, to change the way we provide logistics support, to change the ways we manage repairable items, and announced at that time that we were basing our budget and our 5-year planning on a $39 billion reduction in the cost of doing business within DOD.

This had nothing to do with weapons systems, had nothing to do with force structure changes. It had only to do with improvements in the efficiency of operation.

Since that time, we have undertaken a series of further steps using basic management tools. One of the steps is a full scale review of the DOD financial system. This review will result in an upgraded standardized system which is more responsive to the needs for updated financial information, and to be fully in compliance with direction issued by the GAO resulting from their recent Air Force audit.

It also included a full review with an eye to standardize our entire automated data processing system. Without these two tools, responsive financial and ADP systems, no management can operate successfully. You need accurate and readily-available financial information in order to determine what steps are to be taken, and you need an automated data processing system that works among the services and with OSD. And these two programs are well under way now.

As recently as a week ago, we announced the consolidation of our commissary systems and the consolidation of our supply depots, beginning with a protype of five supply depots in the San Francisco Bay area. So in addition to that progress report we have taken additional steps and we continue to take steps to fundamentally improve the way we are doing business.

We have also taken concrete steps to improve the responsiveness of both the defense industry and the Department to charges of corruption, and I am pleased to report that the cooperation that we are getting from industry and internal to the Department are going to pay strong dividends in the years ahead.

Now, there are a number of things which need to be done beyond that, some by the Department itself and some with the assistance of Congress. Within the Department, we feel that there is a tremendous problem which arises because of the need for advanced technology and a need for industry to continue to be valued suppliers of that technology as well as the weapons.

We are faced with a situation with our suppliers that if faced by any industrial organization in this country would soon be out of business. Company after company is anxious to get out of the defense business, and there are several major suppliers who are trying to sell their business or who are getting out.

We need to address the root causes of why those companies do not want to continue business with us, and who will be lost from the strong technological base that we need in the years ahead. We are addressing that, and you raised some questions today and I would be happy to answer any questions in that regard.

Beyond that, we feel that there is micromanagement that occurs by the Congress and the DOD on our suppliers that is dissimilar from the kind of management major manufacturing has in the commercial world. We propose this legislation in an attempt to develop business relationships more like those found in the private sector.

Perhaps one of the most significant aspects of our proposed legislation is this pilot program of six systems—six weapons programs—in which we would operate as a commercial industry operates. We are aware of case after case of suppliers which have a commercial line, and in the same building have almost the identical product being made for the military. On the military side, there may be as

many as 250 inspectors, checkers, auditors, inspectors of the auditors and auditors of the checkers. And on the commercial line there is not a single representative from the air frame industry or from the airlines.

Now what is the difference? The difference is that it is costing us a lot more money than it costs the commercial world, for the same product. It is from that sort of management that we want relief. In no way do we want to do away with the right of the Government to audit, check, and inspect at any time. When dealing with public funds you cannot abrogate the right of the Government to audit and check.

But there is a difference between doing that and sending in hordes of people who just live there, day in and day out, who really become almost a menace to the mode of operation. I think that is one of the root causes of industry's desire to get out of this business.

A second area that we've talked about, and that I have discussed with Senator Levin, as he mentioned, is the commercial products area. The simple truth is that when we go to buy a commercial product, everyone out there feels they have a right to bid. Therefore you need some kind of a marker that says we are going to put specifications so we can either disqualify bidders or hold them up. And that is how you end up with a 20-page specification for a fruit cake or why you end up with a 15-page specification to buy catsup.

Because someone out there will say, well, I can make catsup or I can make fruitcake, and what they might do is come in at a price half of what a commercial supplier does, and go out and buy a bottle of catsup, add two bottles of water to it, and sell it to us. It is still catsup, but it does not meet the requirements and therefore we have to put detailed specifications on it.

We are seeking relief which will permit us to buy commercial products on a commercial basis, without having to go through a disqualification of people. I think that is at the root of that part of the problem.

Another part of it is the continuity of funding. We ask industry to make major investments, investments in new technology, in new equipment, in new machinery, and we give them a 1-year contract. How practical is that? Would any of us make major investments with a 1-year contract? Of course not. We need to have continuity of funding in order to encourage the defense industry to make the kind of investments where they can earn an equitable return on their investment. We therefore seek that kind of continuity in the funding.

There are others that we will talk about later as you have questions, but this is the genesis of it, the genesis of what we are seeking in a test program, a pilot program, to test six major weapons and some relief which will permit commercial style practices. We seek these things to encourage the cultural change in the Department of Defense.

I think if we obtain the relief that we seek, we can make substantial additional savings perhaps doubling the $39 billion that we have already identified over the next 5-year period.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Atwood follows:]

STATEMENT BY

DONALD J. ATWOOD

DEPUTY SECRETARY OF DEFENSE

Mr. Chairman,

Thank you for the opportunity to be with you today to discuss the Department of Defense's ongoing efforts to implement the Defense Management Report (DMR) and, in particular, the Defense Management Improvement Act (DMIA), which we transmitted to Congress on April 5, 1990.

Before coming to the Pentagon, I knew that we would confront a management challenge that exceeds nearly any other faced in the private sector or in other federal agencies. Extensive management change is never comfortable, but heading up a reorganization of an institution the size of the Department of Defense (DoD) is the challenge of a lifetime. However, the challenge is not just ours; it really belongs to all that are involved with defense -- the DoD, Congress and Industry.

I can report that while we still have a big job ahead of us, the DoD has come a long way in doing its part. In January 1990, we made a progress report of our accomplishments to date. We plan to put forth another progress report later this year.

It is important as we proceed to resist the temptation to think that there is an immediate, one-time solution to the management problems

in the Pentagon. There clearly is not. Success is possible only by staying with the continuous, day-in and day-out, nitty-gritty work of bettering overall management. We can only improve if we do the basics right.

Last fall, we identified a number of specific initiatives to reduce overhead, eliminate redundant functions, and streamline operations -- all designed to reduce the cost of "doing business" while maintaining military strength. Some were approved, others were rejected, and others were returned for further study. Those approved will lead to savings of approximately $39 billion over the period from fiscal year 1991 through fiscal year 1995. Let me give you a few examples of how we intend to make the $39 billion savings a reality.

First, we have consolidated almost all contract administration services under the Defense Logistics Agency (DLA). This will reduce management overhead and permit a more consistent and stable relationship with our suppliers. This is an idea that has eluded implementation for over twenty years.

A second example is our broad effort to reduce supply costs. Beginning in 1991, the total cost of operating the supply system will be reflected in the cost of materiel. This will highlight the actual cost of operation and will give managers greater flexibility in making decisions that will lead to overall cost reductions. For years, we have taken a disjointed approach to focusing on process inputs. This system will give us a visibility of the total cost of doing business and permit trade offs to reduce expenses.

We have also approved a number of DMR initiatives to reduce DoD transportation costs. Many of these initiatives adopt management practices which have been tried and proven in the private sector: These include the development of Regional Freight Consolidation Centers which will operate like federal express hubs, the greater use of direct vendor deliveries to the customers and the most efficient placement and storage of materials.

We have also improved the way we manage repairable items by requiring the Army and Air Force users to budget and pay for new repairable items rather than continuing to get parts at no cost to them. Based on the success that the Navy had in implementing this change a few years ago, we expect that stock funding repairables will drive the requirement for new parts down -- resulting in a significant savings.

We have initiated the elimination of more non- value-added functions and eliminated layers of management in the acquisition system. This will result in the reduction of nearly 26,000 personnel during the next five-year period.

Less than two weeks ago, we announced that the commissary systems of the Army, Navy, Air Force, and Marine Corps would be consolidated. This decision was based on an in-house study which indicates that consolidation into a single organization would result in significant efficiencies and economies. It would also yield improved service to our customers -- officer, enlisted and retired personnel alike -- while at the same time providing savings of $90 million per year.

The same day, we also announced that the material distribution function of all 35 supply depots run by the Military Departments and the DLA will be consolidated. This consolidation will start with 5 depots in the San Francisco Bay area which will serve as the prototype for the remaining 30 depots. It is estimated that the consolidation on the Bay area alone will save $127 million from fiscal year 1990 through 1995.

We have made numerous other small changes -- the attention to detail that is so critical to overall success.

And there is more work being done. We will soon receive completed study reports on options to improve the management of a number of other common functions like financial and accounting operations and the management of research and development laboratories.

One of the most critical ongoing efforts involves developing standard, integrated financial management systems. These systems designed with common data requirements will improve our financial management process and eliminate unnecessary redundancy. The future systems will provide management with the necessary visibility and appropriate information for proper decision-making. Three project teams are developing the DoD functional requirements for financial operations, government furnished property, and civilian payroll systems. Another team is being formed to work contract payments starting next month.

These groups fall under the broader effort to develop a DoD corporate information management system. No management works well without the essential information delivered on time and in a format that can be readily used. To help guide our efforts, we have assembled an executive level group from private industry and academia to advise us on how best to collect and manage business information in the DoD.

We are also conducting a top-to-bottom review of the Acquisition System. Our regulatory reform task force is eliminating the thousands of unnecessary contract clauses and regulations which micromanage the contracting process. The Undersecretary of Defense for Acquisition is directing this major overhaul of the system which, I believe, will put in place many of the proven management methods and tools essential to the cultural change that we seek.

We plan to sustain this momentum and are now expanding our efforts to improve defense management. The Military Departments, Defense Agencies and OSD are all working to identify further management improvements for submission to the Comptroller by August 1990. We will review them this fall and will make a decision on which should be implemented in fiscal year 1992 and beyond.

With that brief description of what we can accomplish by ourselves, let us turn to how the DoD and Congress together can expand our activities. Congress can help us improve defense management by changing some of the legislative requirements which prevent or inhibit rational, business-like management. The Defense Management

Improvement Act, considered with two other administration legislative proposals, the Defense Officer Personnel Management Act (DOPMA) revisions and the Federal Pay Reform Act of 1990 (which should be transmitted to you shortly), will give the Department a better ability to manage programs and personnel.

Let me say at the outset that the purpose of the DMR Legislative Proposal is to enhance efficiencies, encourage effective competition and permit our managers to use common sense, good business management practices. There are many DoD functions that have clear private sector parallels. We will better serve the tax payer if we selectively apply the lessons already learned in the private sector. Our legislative proposals try to do just that.

I'd like to highlight some of the provisions of our proposal.

One of the most important provisions of the bill would create a Pilot Program to select six acquisition programs to demonstrate the effect of using commercial type practices. One serious problem in the Department of Defense is the lack of flexibility available to program managers and contracting officers. Over the years, laws and regulations have supplanted the opportunity to use common sense and good judgment. Countless laws and regulations limit opportunities for creative solutions and approaches. Fear of making a mistake leads many to take the path of least risk. Most often this is a path that ties up the procurement process, making it cumbersome and much more expensive.

We are working hard within our own parameters of responsibility

to streamline the self-imposed burden of regulation. The Pilot Program will give to contracting officers and program managers the flexibility they need to effectively contract for and manage a select number of major programs. We believe that if the Department is permitted to apply private sector management techniques, we can reduce costs and manage programs much more effectively. This will allow us to create a regulatory environment similar to that facing most businesses in the private sector. It is not practical to make a list of every single law or regulation we have in mind in this report. However, they include significantly reduced
government audit and inspection personnel and greater emphasis on contractor performance.

A major goal of this program will be to eliminate all the unnecessary, extremely costly oversight and reporting functions that now exist, both with respect to the contractors and the procuring agency. These can be accomplished without sacrificing the right or authority of the government to conduct essential audits and inspections of contractor performance.

Another statute that we have requested be revised is the one which requires dual sources for all major programs and major subsystems of programs during full-scale development and production. This is currently a requirement unless the Secretary justifies in writing and reports to the Congress that it is not appropriate. We are asking for relief from this provision that assumes dual sourcing is always appropriate and creates unnecessary procedural requirements when

determination is made that dual sourcing is simply not cost effective. If this provision is not modified, we would seek a waiver as part of the Pilot Program mentioned earlier. Similarly, another section requires us to use a competitive prototype program strategy in the development of a major weapon system unless we submit detailed justifications to Congress. These types of constraints do not exist in the commercial world. While the goals behind them are laudable, we believe that we can eliminate them and use sound private sector management techniques and buy a quality weapon system on a more cost effective and more efficient basis.

Another proposal would also put more reliance on the use of commercial products to meet the DoD's needs by authorizing contracting officers to use streamlined commercial style procurement procedures , to rely on a product's demonstrated success in the commercial market place. This proposal would also enable us to remove many unique contract requirements that apply only when the Government is a party to the contract and that prohibits or discourages many sellers of commercial products from competing for Government business

The DMR Legislative package also contains a proposal that would permit the Department to award contracts on the basis of greatest benefits to the agency rather than on strictly the lowest bid without conducting discussions and obtaining best and final offers. That is, we

could look at a contractor's quality and past performance, not just his bid price.

We also are proposing the elimination of the requirement that multi-year contracts must have a clearly demonstrable savings of at least ten percent. The "ten percent" threshold is arbitrary. A savings of under ten percent on a multi-billion dollar program can often be substantial. Thus, we believe we are missing many opportunities to make considerable savings through the use of multi-year contracts.

We are also proposing that the threshold for the mandatory submission of certified cost or pricing data be revised from $100,000 to $500,000. Since Congress raised the threshold for Cost Accounting Standards from $100,000 to 500,000 in 1988, this would seem the logical next step and would recognize the impact of inflation that has occurred since the act was passed in 1962. To raise this threshold would significantly reduce the paperwork that industry finds a major impediment to doing business with the Department of Defense. Further, it would not reduce oversight because contracting officers would be able to request the data for smaller contracts in cases where they believe it is necessary.

The personnel related Legislative Proposals in our Bill would enhance the Department's ability to recruit and retain qualified civilian candidates. We have worked closely with the Office of Personnel Management (OPM) and are fully supportive of the proposals which will be contained in their legislative package as well. We share OPM'S goals

to increase the flexibility in the pay system to adapt to special circumstances; strengthen the link between pay and performance; and make pay, especially for critical skills, more competitive with the private sector.

Our draft legislation on military personnel has two purposes. The first is to give the Secretary of Defense the authority to make needed changes in manpower and force structure as the need arises. Enlistment bonuses, and variances in officer strengths and senior enlisted grade strengths are intended to achieve the kind of flexibility the department requires in order to meet the changing conditions that we will face during this decade.

The second and closely related purpose is to give the Department the authority to reduce manpower in a way that makes sense. We will not be able to improve efficiency and streamline management structures while retaining the quality of a smaller force unless we have the expanded authority we have requested. For example, the proposals to amend DOPMA would increase our ability to encourage early retirements by easing restrictions on voluntary retirement, permitting separation pay in certain cases of volunteer resignations, and expanding selective early retirement boards.

These flexibilities are needed to maintain the proper mix of skills and experience and to make the necessary reductions in an orderly and considerate manner. This is, after all, an all volunteer force and we must treat those who leave with dignity and understanding. How we treat today's volunteers in this period of great change will have a tremendous

effect on those considering volunteering in the future.

In addition to your favorable consideration of the administration's legislative proposals, improvement in defense management also requires that the legislative branch address those congressional processes and oversight which do not enhance better management of the DoD. We ask the Congress to move its perspective beyond budget lines to broader forms of oversight, to better integrate its multiple policy goals, and to work together with the Department to reduce the level of detail in budget material. Reform of the congressional oversight process is an important element in improving defense management. We have a tough job but we owe it to the taxpayers and future government leaders to forge a better-working-relationship.

Senator BINGAMAN. Thank you very much.

Did either of the other gentlemen with you wish to make a statement now before we have questions? [No response.]

Senator BINGAMAN. We have had two other committee members appear here. Senator Nunn, did you have any opening statement you wanted to make?

Senator NUNN. No, thank you, Mr. Chairman.

Senator BINGAMAN. Senator Cohen.

Senator COHEN. No, Mr. Chairman.

Senator BINGAMAN. Let me start the questions. Before I ask about some of the proposals on acquisition reform, let me just press the point a little bit about whether we have a disagreement on the proper role of the Department of Defense in supporting industry's efforts to develop critical technologies.

That is an issue that we sort of dance around, but I do think that the recent action with Dr. Fields raises it again.

Let me see if I can get your response. We had a hearing last fall where the President's science advisor, Alan Bromley, indicated his strong belief that the Department of Defense should aggressively support research. And I think the phrase that he used was research on critical, enabling, generic, pre-competitive technologies. And that we should use a variety of ways to do that. And that it was a very legitimate activity as part of our technology strategy for the Department of Defense.

Is there a disagreement about that, or is that something which you can subscribe to as well?

Mr. ATWOOD. I had not planned to talk about the technology as part of this, but I am very happy to. So let me just think out loud with you, if you will.

Number one, there is no stronger adherent to the role of technology in the future of this country than the person sitting right here. It has been my way of life for the last 30 years. I believe in it.

The countries and the companies that lead the way in the development of new and advanced technology are those same countries and companies to which accrue the highest standard of living and the finest quality of life. That is true if one goes back to the early days, in the early 1800s, and it was true of the innovative technology that occurred in Europe, and later in England. It accrued to the United States in the late 1800s, and through to the mid-1900s.

And with that basic thrust to new technology came tremendous innovations and enhancements to our quality of life.

I go back to 1946 when I and 12 million other Americans were released from the services. Many articles were written at that time about what would be the defense posture of this country. We had the atom bomb, but we had no visible means of getting it there. The B–29s were now obsolete. The B–36 had not come into being. People wondered if we should use the V–2 rocket that we had taken over from the Germans?

But the problem was, that it had a range of 200 miles and an accuracy of 7 miles. At that time there was no visible way to improve either the range or the accuracy of the V–2. There was not a mention of ballistic missiles. People at that time talked about some day maybe we will have something that will circle the Earth. They did not even call it satellites.

Fifteen years later, based on the technological work that was done, much of it, by the Department of Defense, we developed operational ballistic missiles with an accuracy of a fraction of the error talked about in 1946—operational intercontinental ballistic missiles. We had satellites in orbit for observation, for reconnaissance, for communications, and for weather observation.

A whole new way of life developed because of the work that was done in technology, and a large part of it done in the Department of Defense, or through the Department of Defense to major contractors and to universities.

Nothing would be further from my mind than to impede the continuation of that kind of technology. What will be the parallel example of the satellite or ballistic missile 15 years from now? It is not that long from now. We are talking about the year 2005. We need to continue to invest in technology.

Now let me come back to your question about Craig Fields. I heard three times that Craig Fields was fired. Craig Fields was not fired. We have a very critical program, as a part of the Defense Management Report, to review all of the various laboratories and research programs in the Army, in the Navy, in the Air Force. This review will ensure that we are not duplicating effort among them and that we are not missing some elements that ought to be investigated with an overall focus of getting dollars returned for dollars invested.

We offered Craig Fields the opportunity to be Deputy Director of the Defense Research and Engineering Organization for Defense

Management Report Implementation. He has accepted that position, and I am glad he has. He will do an outstanding job. This job directly ties in with the effort to implement the Defense Management Report.

So Craig Fields was not fired. Craig Fields was offered an opportunity to head up a very vital role, and he has accepted it. And I am pleased for it.

Senator BINGAMAN. Let me ask on a specific aspect of this DOD work to support technology development. Senator Nunn and I worked this last year on language that was put in the defense authorization bill to give DARPA the authority to enter into cooperative agreements with industry to pursue critical technologies. It is authority that NASA has had for many years, and we granted the same authority to DARPA.

One of the reports that was widely circulated in the last few days was that the decision by DARPA to go forward and exercise that authority for the first time, in connection with a small company in California, was objectionable to you or others in the Department, and the exercise of that authority was part of that which initiated the change and the transfer of Craig Fields out of the head position in DARPA.

Could you comment on whether you think that authority is appropriate, whether it is something you would like to see exercised again, if you think there is a problem with the way it was exercised?

Mr. ATWOOD. I think that authority is appropriate. In that particular case, Craig Fields checked with the Director of DDR&E, and with the Under Secretary for Acquisition, and obtained their general approval to move ahead. They had asked that he return with any specifics before he made any formal announcements, but, in general, they agreed with the approach he was taking.

That authority rests within DARPA and within the Under Secretary for Acquisition. And I do not question that one bit.

So, as far as I am concerned, the particular project that they undertook, which was the development of a switching system, or electronic device, using gallium arsenide rather than silicon, is something that we ought to foster. As you know, all our integrated circuits today are essentially done with silicon. Gallium arsenide is a new material which offers substantial advantages, particularly speed of operation and nuclear hardening.

And DOD should be sponsoring work in gallium arsenide, as well as in silicon, in order to take advantage of the new technologies. I have no problem with that at all.

Senator BINGAMAN. All right. My time has expired. Senator Wallop.

Senator WALLOP. Thank you, Mr. Chairman.

And Secretary Atwood, let me say I am glad you had the opportunity to clear the record on Mr. Fields. It was hard to sit here and listen to the accusations of firing when some of us, at least, know that there was another tale that could be told, should be told, and now has been told. So I appreciate that.

Mr. ATWOOD. I have a hard job beating the news media, though.

Senator WALLOP. Well, the news media often has its own agenda with which it seeks to operate, especially in areas of the Department of Defense.

Your commercial products proposal does not specify which laws or any laws and regulations subject to waiver. So, in your view, how much of the barrier against the use of commercial procurement practices is a result of legislation, and how much is a result of internal DOD regulation and procedure?

Mr. ATWOOD. I would like to give you a general answer to that, and then perhaps turn to Mr. O'Donnell, our General Counsel, for a little more detail on the legislation itself.

It is a handicap. As I mentioned earlier, we are dealing with public funds. And that gives us two responsibilities over and above that which you might have if you are running a commercial company. Number one, we have an obligation to protect those funds, to make sure that there is no way in this world that they are misappropriated or spent foolishly.

Second, it gives every potential supplier in this country a feeling that since we are spending public funds, they have a right to bid. Many feel they have a right to the business, but everyone feels they have a right to at least bid.

We have no way of stopping them from bidding unless we can prove that they cannot perform. To deal with this circumstance, we set up a series of discriminating specifications—and discriminating not being a bad word in this case—discriminating specifications against which we judge whether or not the products being offered do meet your requirements. This is a long, tedious, laborious task to evaluate the products of everyone who feels that he can fulfill our requirements.

In the commercial industry—and we learned a lot from the Japanese in this regard—you do not necessarily contract with the lowest bidder. You develop over a period of time stable suppliers who have a proven record of giving you a high quality product which meets the performance you seek, at a reasonable price.

We need, as we go about acquiring commercial products, to use specifications which more nearly are in alignment with the specifications that are used in the commercial world.

Senator Levin and I have talked about the many cases where there are commercial products available on the open marketplace. We, I feel, should have a right to buy those commercial products based on the specifications that are used in the commercial market place without having to develop long, tedious, government specifications, which become discriminatory against people who really cannot meet them.

I think there is much to be gained by buying commercially. There is much that we can do to get better quality, and at the same time save money.

Senator WALLOP. I agree with that. The question really is how you get there. But the follow-on question, and Mr. O'Donnell may wish to answer it, but the most obvious impact of section 202 would be relief from the legislative restrictions. The real key, then, is what efforts are underway in DOD to waive or eliminate on a similar wholesale basis the regulations and procedures that block the use of commercial buying practices.

And how, then, do you still maintain the protection of the public interest in that?

Mr. O'DONNELL. Senator, we have in the Department a number of impediments as well. And we are attempting to deal with those impediments to the acquisition of commercial products. But without the statutory changes, we are never going to get there.

There are six separate initiatives under way right now, and I could provide these to you in writing, and would be happy to do so, to show that we are working internally within the Department of Defense to make it easier to acquire commercial products.

But without the statutory fix, if you will, we are not going to be able to succeed in really taking advantage of these products. From our perspective, the Government incurs substantial productivity losses and cost increases when it fails to take full advantage of the large economies of scale and the short delivery times, efficiencies and innovations that are available in the commercial market.

This is a disaster from the standpoint of the taxpayer, and from the standpoint of industry in this country that government cannot accommodate its buying to acquire commercially available, commercially proven products.

We have a job to do within the Department, but without the legislative assistance, we cannot fulfill this responsibility.

Senator WALLOP. I do not quarrel with that. I guess for the record at this moment in time the provision looks pretty much like a blank check, with amounts to be filled in. In other words, in not specifying either the laws or the regulations to be waived you are asking us to take an awful lot on faith.

Clearly there would be more support for this if we were able to get some focus as to which laws might be subject to waiver. Would that be possible?

Mr. O'DONNELL. Yes, sir, it would, absolutely.

Senator WALLOP. Then maybe we would want to have some limitation that would surround those. In other words, what I am asking you is not to ask us to sign a blank check, because I do not think we would get there. I think we would stop before we ever got started.

For example, lets look at section 217, the pilot program to test new ways of managing programs in DOD. The provision is silent on the issue of how you measure the success of that program and when you expect to know the results of using these more flexible procedures. What will be the measures of success?

Mr. ATWOOD. We have talked about using programs which are in the concept phase or the demonstration/validation phase, which means they are early in the developmental cycle. We have pre-determined criteria that they must pass before they move from one phase to another.

I believe that a measure of success will be, are they achieving the necessary criteria as they go from one phase to the other, without exception, within the dollars that were budgeted for it and with the kind of reliability, performance and delivery schedule that we contracted for? If we are able to do that, those are successes.

I have not had the opportunity to come here to tell about a success story. I think almost every program that I have seen has either slipped, is late, or is deficient in some respect. There has

always been some excuse as to why a program is not passing some milestone criterion. I think that avoiding this would be a measure of success.

Senator WALLOP. Mr. Chairman, my time is up. Again, I would hope that before we get to the markup on this legislation that we would have some definition of those milestones and criteria upon which we could base a judgment from the standpoint of Congress.

Mr. ATWOOD. I think that is a point well taken, and before we select the programs, we should do just that so that we know going into it what we are using as the criteria.

Senator BINGAMAN. Senator Glenn.

Senator GLENN. Thank you, Mr. Chairman.

Mr. Atwood, the military personnel title of your proposal requests a number of changes to military personnel statutes governing control on military personnel strengths, the tenure of certain officers, and the payment of certain bonuses. The changes will be considered by our Subcommittee on Manpower and Personnel that I chair during the markup of the fiscal year 1991 defense authorization request.

I do not want to address each one of these changes in detail, but section 102 of your proposal would repeal the temporary nature of enlistment and reenlistment bonuses for active component enlisted personnel. Under current law, these authorities are renewed as necessary and your proposal would make them permanent.

Why are you asking for this authority when Active force strength levels are expected to decline sharply over the next few years? The Army is talking about a 25 percent reduction by 1998.

Mr. ATWOOD. That is one of the enigmas in this package, and another one which I perhaps will preempt a little bit is we are asking for some increases in certain classes of people when in fact we are taking the total down, as you know.

This will give us the flexibility to handle particular cases in which we are in short supply of personnel. For example, health services doctors, nurses, technical aides, technicians, are areas we are often in short supply of, and even in a drawdown we will probably need to protect or enhance the number of personnel in these areas.

So, the provisions that you are questioning are to give us the flexibility to handle that. But I do not want to indicate that the purpose is to increase the force level. The purpose is to permit the Department the flexibility to rationally draw down our military in line with our mission and at the same time treat the people going out with respect and dignity so that they are pleased they served.

Again, these are volunteers, most of whom wanted to make a career of military service, and for one reason or another, through no fault of their own, will be forced out.

Senator GLENN. There are a number of other temporary bonus programs. The principle that accession and retention bonuses should be authorized on a temporary basis has a very long history in this country, going back, in fact, to 1791. We have had bonuses ever since that time, but they have been changed, intermittently renewed, as the military requirement changed.

Certain numbers of the Reserve components and nuclear-qualified personnel, medical personnel, aviators, other target communi-

ties are authorized these accession and retention bonuses on a temporary basis. Why do we single out just enlisted and reenlistment bonuses for Active force, and do you consider the other temporary bonus programs to be of less priority?

Mr. ATWOOD. No, I do not consider them to be of less priority, certainly not. I think they are every bit as important.

Now again, our package should be considered in concert with the one, the Defense Officer Personnel Management Act (DOPMA), as well as those portions of our legislation which have been incorporated in OPM's Pay Reform Legislation. I regret that I am not able to give you a total one-package program here, because some 10 or so of our provisions, were incorporated in the OPM bill, and some time ago we transmitted the DOPMA package to the Congress.

Senator GLENN. Section 108 of the proposal would waive the statutory requirement for a promotion selection board to pick officers for promotion to the O–3 grade whenever the needs of the services require advancement of more officers than are eligible for promotion.

Now promotion of officers under this circumstance would be left up to the discretion of service Secretaries, I guess by regulation. They could pick anyone they like without a selection board.

How would officers be screened for promotion under this? Why did you not just propose, if you need additional people, why not just expand the eligible area and let the people be competitive in being selected? The way it reads right now, if you get down in that situation somebody is just going to start picking friends down the lineal list. That could happen.

Mr. O'DONNELL. Senator, if I might, one of our goals there was to save money and eliminate the need to have these boards when, under 10 USC 622 analysis, which is required, there are indeed more vacancies than there are people eligible to fill them.

In that case, the board is a redundant requirement. It is expensive. It causes dislocation. And it does not seem to be necessary to the services who proposed this legislative initiative.

Senator GLENN. Well, would not the same argument apply to regular selection then? Why have a selection board to begin with if it is expensive? They are set up to make sure that it is a competitive system, people are dealt with fairly. We are not one of these military dictatorships where the boss just reaches down and promotes whoever he wants at whatever level. We deal with our people more fairly than that.

Mr. O'DONNELL. Yes, sir, I agree with that. But in this case it is a rare situation where everybody is going to be promoted unless there is some additional problem. You have more vacancies than you have people.

The normal case, of course, is that you have less opportunities for promotion than you do have people who are eligible and the board serves an important purpose of determining.

Senator GLENN. I would think what you should be going for is, in a case where you see a need for more officers like that, if that case arose, you would want a waiver to give authority to expand the eligible zone but let them all go through a selection board.

Mr. O'DONNELL. That proposal might have some merit, although I do not know whether it would specifically meet this objective.

Senator GLENN. I will be glad to discuss that further with you. We will be bringing it up at one of our hearings on the Manpower Subcommittee. My time has expired. Thank you very much.

Mr. O'DONNELL. Sir, if I might, one of the issues relating to the selective reenlistment bonus, in addition to permitting us to fill critical skills, there is a problem now in a gap that is created by the expiration of those bonuses at the end of the fiscal year and the DOD Authorization and Appropriation Act's implementation dates.

This is a problem that arose, I believe, last year, and perhaps that can be solved in another way as well. But it is a problem of a month or two where reenlistments and particularly in the critical skill area are in jeopardy because the authority to provide the bonuses may not be available.

Senator GLENN. My time has expired. Thank you, Mr. Chairman.

Senator BINGAMAN. Thank you. Senator Cohen.

Senator COHEN. Thank you, Mr. Chairman.

Secretary Atwood, one of the great poets said that we shall not cease from exploration, but at the end of all our exploring will be to arrive at the place where we began and know it for the first time.

I am struck by that particular quote because it seems to me what you are recommending, in part at least, might bring us exactly full circle back to the place where we began, and I think that many of us have known it for a first and second time. That is to go back to the days prior to some of this congressional micromanagement that you cite.

One of the reasons that Congress became involved in so-called micromanagement was because we had an old-boy network that was in place. People who left the Pentagon went into the private sector, maintained contacts, were able to secure contracts for their employers. They had sweetheart deals. It ended up costing the taxpayers millions, indeed billions, of dollars through fraud and waste. That prompted a number of reactions by Congress, and perhaps, as you suggested, we may have gone too far.

But I would like to go back and just take a look at some of the things that we have done. I assume that out of the six major defense programs you would like to see exemptions from the procurement laws and regulations you would like to include the Competition in Contracting Act.

Now from what I have found, as a matter of fact, during the hearings we held on the Ill Wind investigation, the Defense Department argued that the Competition in Contracting Act and other things were impediments that encouraged contractors to resort to fraud.

I find that to be an extraordinary position taken by the Defense Department to say competition in contracting has encouraged defense contractors to engage in fraud.

The figures that I have on cost savings from competition: Tomahawk cruise missile is now $367,000 less per missile as a result of the Competition in Contracting Act. Prior to that time it was $300,000-plus higher.

In the Aegis cruiser, $2.8 billion has been saved as a result of having competition. The Navy indicates that about $6.8 billion has been saved in the shipbuilding accounts as a result of competition

in contracting. We have report after report indicating that this has been a major boon to the taxpayer, as well as to the Defense Department.

So I was wondering, with this kind of results, how would you justify exempting six major contracts that have yet to be identified from the Competition in Contracting Act?

Mr. ATWOOD. Senator, we are giving it a lot of consideration, and would be very happy to discuss with you the kinds of contracts. But we are not talking about contracts that are just gleams in someone's eye. We are talking about programs which are at least through or nearly through the concept phase and into the demonstration and validation phase. And in some cases, they might even be in the full-scale development.

They would be beyond the time period when you would have had initial competition. So I have no problem with that at all.

If my only concern was competition, I might go directly to dual sourcing. One of the concerns that we face is, on the one hand economy. We therefore cannot always afford quantities large enough to support dual savings. Where the quantities warrant it, having two sources of production provides the kind of competition which does give us benefits, and we should never deviate from that.

Senator COHEN. Is there anything in the Competition in Contracting Act that prevents you from having a sole source if national security requirements dictate that?

Mr. ATWOOD. There is nothing that prevents you from having a sole source, but anytime it is appropriate to go to a sole, I must spend a good portion of my time up here. We require relief in order for us to be able to have the flexibility when the quantities being acquired really do not warrant establishing a second line.

Senator COHEN. It seems to me that in the CICA Act itself, it has seven exemptions. It could be a situation where there is only one responsible source, where there is an unusual and compelling urgency to maintain a particular facility for national emergency, because of international agreements. You have a specific requirement or statute directing that.

I mean there are seven major exemptions, any one of which you could cite. And the only one that really requires—the head of an agency determines it is necessary in the public interest to use other than competitive procedures. And you must give Congress 30 days notice.

But the others, you have got six exemptions there, and if you need to broaden these, to change these, it seems to me that is the way to go. But to simply say just exempt us, does not sound particularly responsible.

Mr. ATWOOD. Well, I think that sounds all right on the surface. I can take any one of these provisions and make a case for not having any legislative relief. I will assure you that the oversight which is imposed by Congress on us and the resulting oversight that we impose on our defense contractors is having a devastating effect on our contractors ability to stay in the business.

Senator COHEN. Do you intend to have a commonality of regulations for all the services? One of the most persistent complaints that Senator Levin and I have heard is that you have one set of

regulations for a different service than the other, which may be completely different.

One of the things that is of concern is why should there not be some commonality of procurement, for example? Senator Goldwater raised a lot of hackles years ago when he suggested we might have one sole source procurement agency within the Department of Defense. And the answer was, oh, no, we cannot do that, because, after all, each service has unique requirements.

What do you recommend in terms of reforming the procurement within the Department, other than saying it is congressional micromanagement? What about uniformity and commonality of regulations across the services?

Mr. ATWOOD. I think that is a good notion. We are using that assumption as the basis of many of the things that we currently have underway. This includes the automated data processing I mentioned earlier, the financial reporting, the supply depots, the maintenance depots, and the entire area of acquisition which is now being further consolidated.

John Betti is the Department's third Acquisition Under Secretary. The position has grown in stature, authority, and responsibility with each of them. Within each service there still remains a large degree of responsibility for procurement of those items which do not fall under the Defense Acquisition Board, which is chaired by the Under Secretary for Acquisition.

The Under Secretary of Defense for Acquisition has a momentous task of overseeing all of this. But he has the authority to direct any of the service Secretaries in any acquisition matter. So far he has not had to invoke his authority because, I think, the present group of service Secretaries are very cooperative, and work well with him on all acquisition matters. But he has that authority now.

Senator COHEN. My time is up. Thank you, Mr. Chairman.

Senator BINGAMAN. Thank you. Senator Levin.

Senator LEVIN. Thank you, Mr. Chairman.

As I indicated, Mr. Atwood, I have some real problems with the request for sweeping exemptions in laws without the case being laid out for them. You have not made that case. You have stated your conclusions, but the case, the documented case, the specifics have not been presented to us. And I think it is critical, even if you are going to achieve some modifications, much less waivers and exemptions, that that case be laid out for us.

You and I, I think, are basically of the same mind relative to commercial products. And you have been trying to push the purchase of commercial products by the Defense Department now for years. We passed a law last year which we thought gave it a push. There were some deadlines which have been set internally by you that have not been met that would lead to greater use of commercial products. Your own schedule which has that goal in mind has not been met. And that is what really troubles me, and I want to talk to you about that.

I mentioned that you set some deadlines for last November and December for a commercial products agenda. There were five items that you were going to accomplish by those deadlines. None of those actions have been completed. And none of them took congres-

sional action. All of them were aimed at promoting commercial product use.

Again, there was a handbook that would promote commercial products that was scheduled for December. That one has been postponed. It is just sort of on and on in my book that what you can do internally and what we have urged you to do internally and authorized you to do internally and mandated you to do internally have not been done. And now you come to Congress and make some requests instead, for instance, for just a waiver of CICA, the Competition in Contracting Act.

In your testimony you suggested that one of the problems to the use of commercial products is CICA. There was a suggestion that, for instance, you could not use a market acceptability test as a way to avoid those lengthy specifications you talked about. Why not just use a market acceptability test to avoid the watered down ketchup?

Mr. ATWOOD. Number one, you and I have discussed this, and I believe we are in concurrence on the basic goal.

Number two, we have much to do in-house. I would be the first one to admit that we are not making progress as rapidly as we would like. However, we do have a series of procurement initiatives underway, including the establishment of a test of 20 commercial products. We expect that this will be a successful program.

DOD management, hierarchy, and bureaucracy were not established overnight. As you know, there is no magic formula, no single step that we can take that will fix our problems overnight. Solutions will require a series of long, tedious, nitty-gritty work in order to change the culture within the Department of Defense.

I think that the team currently in the Pentagon is dedicated to it. They are working on it. They are not making as much progress as perhaps you would like or perhaps I would like, but indeed, they are at least diligently working on that task.

And we are looking toward taking our next series of steps.

Senator LEVIN. Let us get to the watered ketchup issue.

Mr. ATWOOD. Yes, sir. I created that. That is not the real one you know? [Laughter.]

Senator LEVIN. I think it is a very good illustration. Why not adopt market acceptability as a test for commercial products? You do not have to come up with specifications to make sure that ketchup is not watered. You can adopt the market acceptability test. Why not do that now under current law, just adopt that?

Why use the watered ketchup example as an argument for a sweeping legislative change for an exemption for you, a blank check for you, when you can do it without a legislative change? You can avoid the watered ketchup, not just with those 20 pages of specifications——

Mr. ATWOOD. How can I avoid the watered ketchup if in fact I do not buy by a trade name or from a well-known company? Let me say that if I am going to buy ketchup, the first thing I have to ask is, how do I spell it? Each company spells it differently.

Senator LEVIN. Let me answer the question. Why not adopt a market acceptability test for your commercial product? If a product has been accepted on the market, and watered ketchup will not have been, that then will meet your commercial product test. Why not?

Mr. ATWOOD. I think maybe it is being oversimplified when you say that. If you look at the bottle of—I am not a ketchup expert, but if I look at the bottle of ketchup, the ingredients are listed but it does not always list the ingredients by grams or by fluid ounces. If I took that bottle of ketchup and added two bottles of water to it, it still has the same ingredients. Therefore, when I am purchasing something commercial, I may have to identify it by someone's product name.

Senator LEVIN. Well, I do not think you are answering my question. Are you saying that you cannot adopt a market acceptability test consistent with CICA so that you can set as a requirement for the purchase of commercial products either that they have done business with the DOD or that they have been accepted in the marketplace? Can you not do that right now? Are not you doing that right now?

Mr. ATWOOD. You can do that right now, but unless we have specific instructions or have the ability to specify the sources, we run a grave risk that someone will find a loophole which permits him to supply a much inferior product.

Senator LEVIN. It seems to me that this is the testimony that you provided to us, basically, about a year ago, and that this has been answered internally. I mean you have, as I understand it, your assistant Secretary of Defense for Production and Logistics, Mr. Katzen, and in January of this year, directed a task force to develop by January 31 of this year, guidance for using the commercial item descriptions, combined with market acceptability criteria.

Now in order to avoid those 20 pages of descriptions——

Mr. ATWOOD. The easiest part was issuing that directive. The difficult part is to come up with those descriptions. We are doing it for a limited number of items. We are doing it on 20 specific products.

Senator LEVIN. Well, but what happened? Was the January 31 deadline for that task force met?

Mr. ATWOOD. No, that deadline was not met.

Senator LEVIN. You see, what troubles me, again, is I think you have a great deal of support in the Congress for using that authority. I have got to tell you. I mean you and I are together on this commercial products thing. Where we are separated is when you come to us and ask us for a waiver of CICA, when you do not need a waiver of CICA.

Under your own directive here, your Assistant Secretary of Defense says that CICA does not prohibit a market acceptability criteria at all. If it has been accepted on the market, it then qualifies. That is one of your tests for qualifying. You do not need 20 pages of specifications to avoid the watered ketchup. All you need is, have you done business with the DOD satisfactorily, and has your product been accepted on the market?

Then you set a deadline for yourselves of January 31, 1990, it is another deadline, and it is missed. And here we are in April. And now, instead of meeting this deadline and instead of doing what you have the authority to do and we want you to do, instead it is to us for a blank check. It is a waiver without any documentation as to why you need it.

Now if you had the documentation as to why you need it, it is going to be a very difficult and complex case to get waivers of all these provisions, which were put in place in order to protect taxpayers and to assure quality. These came from history.

Senator Cohen said it very well, we are revisiting some history here. These things were put in place because we had some scandals and we had some waste and we had some systems that did not work. So we put in testing requirements and competition requirements to assure that there be lower prices. And now you are seeking a waiver, at least in this case, where you just do not need it. Your own document says you do not need it. You set a deadline to implement it on your own, and it is missed.

So that is the kind of problem that I have, very frankly. You know, you and I work together very closely and I hate to take the position on this which is different from yours, because I have great respect for you and what you are trying to do, and I agree with your goal.

But I must tell you, I think there is a lot you can do internally and that you should do internally that the Congress would support your doing.

My time is up. I turn to the general counsel.

Mr. O'DONNELL. The section 202 that we propose is, I think, fully consistent with regards of CICA in that it seeks competition and fair treatment of competitors and process integrity.

What CICA does not allow us to do now is to make a selection based on the best value to the Government without concluding discussions. This is in part, because of GAO's ruling, as you had mentioned before—and maybe that can be handled separately by legislation—but if you are going to buy commercial products, and the commercial market specializes in distinguishing their products from each other, that is one of the ways that they sell, you need the ability to quickly determine which product offers the best value without resorting to government purchasing procedures.

You are not going to have a uniform set of specifications to make a best value judgment. You are going to have to put some trust in the contracting officer to look at the two products—a toaster that toasts five pieces and a toaster that toasts 10—and determine which one is in the best interest of the Government to buy. You cannot do that based on which is the low price. That is one of the problems that we have with CICA, and that is why we need relief. Commercial products acquisition will not work, unless we have that relief.

Senator LEVIN. I think as Senator Glenn mentioned, you can address that narrow problem without the guard waiver of CICA. But my time is up. Thank you.

Senator BINGAMAN. Secretary Atwood, let me just draw a very unfortunate analogy here to sort of, at least, indicate a reason for my apprehension. I am anxious to try to work with you to ease some of these regulatory burdens, because I do know that they are severe, and I know that some of the statutes on the books caused them to be more onerous than they need to be.

The difficulty, of course, at least from my perspective is that we are faced on the one hand with what happened in the savings and loan area, where when I go home and have town meetings around

my State, people want to know why I was asleep at the switch, when all of the auditing and regulatory procedures that were supposed to be protecting against this kind of thing were dismantled during the last administration. And they understandably are upset about having to pay somewhere between $150 billion and $500 billion to correct the mistake.

In this area, obviously, the main time that the public gets interested is when there is a scandal. And we saw that with the Ill Wind investigation. The public still wanted to know what we have done to change the laws to ensure that nothing like Ill Wind occurs again.

The kind of broad waiver of all of the statutes that is being requested here raises, in my mind, the apprehension that we might do something. We might, if we do not think, through the precise provisions that are being waived that, we might take away some of those safeguards which did make sense. Because I think most of them were put in by somebody who felt at the time that it would contribute something to the safe expenditure and the proper financial management of our defense dollars.

So that is the background. I do not know if you need to respond again. You have somewhat responded to that. But maybe there is a clear distinction between what you are proposing here in the way of waivers of these very statutes and the kind of deregulation that occurred in the other area. But that is the concern about the broadness of the waiver request which is being made.

Mr. ATWOOD. I think, Mr. Chairman, the point is well taken, and I feel that no one from DOD or outside of DOD could sit still for a minute for the fraud and abuse that took place during the period defined by Ill Wind.

We feel that the lifting of requirements we seek does not open us up to that. I will repeat what I mentioned earlier, this is no attempt to abrogate the right or authority of the Government to check, to audit, to inspect, or to do anything it needs to do, in order to ensure that the Government is getting the product that it is paying for, and that it has the kind of performance and reliability that we contracted for.

All we are asking for is a waiver from the requirements which lead to groups of people at plant sites. Over the years we have so many people at the contractors' plants, that often create impediments to good management and to good products and cause a tremendous cost increase. But I would be the last one to ever come to you and say, we should abrogate any right of the Government to go in and do its job.

Senator BINGAMAN. I guess my concern is in saying that we still have the right to go in and audit, and we still have the right to see to it that they are charging the Government properly, and that this may not be an adequate answer, if in fact the auditing is not done, and in fact the checking is not done. And some time down the road, a discovery is made that the Government was in fact mischarged or overcharged or Federal dollars were wasted.

So that is my concern—that by just keeping the right to do these things, and eliminating any requirements that they be done, we wind up in that circumstance.

Mr. ATWOOD. Could I add one quick thing to that?

Senator BINGAMAN. Certainly.

Mr. ATWOOD. Having the right and exercising the right are two different things. When I say they have the right, there is no question in my mind whatsoever about what the auditors and the inspectors must do to get the products we need. I am really referring to the tremendous number of people that we impose on the contractors.

I will give you a case. Just the other day, a gentleman called me from industry and said, you know, we have a series of operations that we call groups. He said, "we have one support organization, which, for purposes of symmetry, we are going to call a group." He got a call from the Government auditor who said, "now that these people are considered a group, I am entitled to 10 more auditors in your operation." No change at all. I use that example to illustrate the circumstances that we have become accustomed to, and that we have to change.

Senator BINGAMAN. Let me ask on multi-year authority. You are asking again for a couple of changes, significant changes in the law to make your ability to enter into multi-year contracts easier. And I guess my concern there, while there are cost savings that obviously can be cited in connection with some programs, the change in the threat has, I think, somewhat changed at least my view of the value of the multi-year contract, at least at this point.

I mean, we have such a fluid situation, and so much uncertainty about what we should maintain capability in, and what programs we should continue to procure and all, that I am concerned that some of the multi-year contracts into which we have already entered. While they may have saved us money per unit—the M-1, the Bradley, the F-16 are examples—now if we determine as we are that we want that we want substantially fewer, if any, or perhaps none of some of the above, we face very substantial termination cost, very substantial penalties, which are a result of having entered into multi-year contracts.

So 2 years ago, the argument for multi-year contracting authority seemed to me to be much stronger than it is today. Because the perception 2 years ago, or 3 years ago, was that as far as the eye could see, we would have these military requirements. Now, there is a lot of question about what our military requirements are likely to be in the future. And, therefore, some of the inefficiency of the Government in going 1 year at a time may prove to have benefited us in some perverse way. If you would comment on that.

Mr. ATWOOD. Yes. I think your concern is valid. As we look ahead over the next decade we are certainly not going to be buying the magnitude of major weapons that we have in the past.

On the other hand, we still will be seeking to procure these weapons systems over a period of years. In other words, it is not often that you would make the investment, nor could anyone do it, of say—building everything in 1 year and then getting out of it. This would result in a tremendous waste of investment and effort. There would have to be some understanding of what is a reasonable production rate that you would tool up for.

If we do not have multi-year procurement, if we go 1 year at a time, any organization that is a supplier that would normally make major investments in new equipment, new technology, new facili-

ties, in order to improve quality, in order to more nearly automate and get cost down would not do that. Because with a 1-year contract, there is just no return for them. And as a result we suffer—we, the Government, suffer. Because we could end up with products which are not quite as capable, which are not as cost-effective, and which, in fact, probably do not have the quality that they could have, if we allowed them or made it worth their while in order to make these investments.

That incidentally, is exactly what we ran into in the commercial field, and it is one of these reasons that you see much of American industry making major investments now—making major investments in new facilities and new equipment. And you probably can recite better than I can, those industries which did not make such investments over the past decade.

Senator BINGAMAN. My time has expired. Senator Wallop.

Senator WALLOP. Thank you, Mr. Chairman.

I find the longer I stay here the more I begin to view myself as perhaps one of the resident cynics. But, I would have to say that, if we were to insist that all previously laid down deadlines were met before Congress acted, we would then have a hard time figuring out how to get Congress to act. Because I dare say that if all the goals of those deadlines would have been met, we would still be some time in passing this legislation, even were it to be devoid of controversy.

With regards to market acceptability test, DOD tried that in 1983. It was prohibited by Congress in 1983. Congress came back and fixed part of it, but not all of it, as has been pointed out here. So you are still left with a kind of a one leg 2 inches shorter than the other. And I cannot help but think of the savings and loan—the parallel is only too appropriate. Congress is always willing to blame anyone but itself.

We were not sweetly innocent in the failures of America's savings and loan. We did not act when requested to; we have looked the other way when our attention was pointed to it. We played a role, but we failed to act, and yet, it is still somebody else's fault. Congress had nothing to do with it.

I guess, what I am trying to say here is that, I urge you to keep pushing on with this thing. And we will solve—hope to solve those problems. We should not put ourselves out in some sweet green pasture where we wait until perfection arises out of the imperfections that exist before we seek to try to change. I mean, it just will not get the country moving toward a more business-like process with regards to procurements and personnel.

Congress does not like business-like things, and in some respects with good reason. Because, you know, we do have accountability with the public's money. And no matter which way you set it up, somebody is going to be burned. But the Congress' big problem is that it always seeks to change the rules and not to punish the people who have burned it. We would be much better off going directly to the fault.

Let me get back to the pilot program. I was asking about measures of success. Will the criteria merely be cost and schedule improvements, or will broader issues such as the health of the defense

industrial base be taken into consideration as you judge whether or not the program has been a success?

Mr. ATWOOD. I feel that the program will be a success if we have defense companies that adhere to the new philosophy of total quality management, that in fact they do discipline themselves to meet schedules, to meet the criterion before they go from one phase to another, if indeed they do provide quality products at a lower cost, and they will be beneficiaries of all of those actions and we will have a much stronger defense industrial base.

I think that is a by-product of having them participate in doing all of these things. We do not do that as an aid to the defense industry, however. I think it will be a natural by-product of it.

Senator WALLOP. Well, let me suggest that that is one of the jobs that you have in selling this program. Whether it is its purpose or a by-product, if it does not result in it then the controversy is even more complex.

In section 217 you also provide the DOD with sweeping authority to waive legislation and regulations. Is this enough authority to truly test standard commercial practices, or do restrictions on personnel have a significant impact on your ability to center accountability within the management structure?

Mr. ATWOOD. Senator, when you say personnel, how do you mean that?

Senator WALLOP. Well, restrictions that you have on whom you can hire, what you can pay, where you can place them—the whole sort of thing which has been also one of the bugaboos of this committee.

Mr. ATWOOD. I think that is a very serious problem that we face, and we do address it partly in the personnel sections and it will be addressed in the OPM package—those provisions that were incorporated there.

One of the things which we need above all else is a cadre, a corps of acquisition specialists, people who are technically qualified to do the job as best they can and as best can be done within industry.

We do have a difficulty in the longevity of some of the people who get assigned to acquisition, when they come from the military. We have a difficulty in establishing a real professional corps. We are making progress. Each of the services have come up with their plans.

But I have to tell you in all honesty that the pay scale, the rewards for people in the Government are not what they are in industry and, as a result, there is difficulty attracting people to government. You know that.

Senator WALLOP. Well, again let me suggest that one of the things that we might want to do is, though you have to have by virtue of the structure of Congress different packages of legislation, have someplace where you outline all of the things that are going on that make the package complete, because some of the moves that we might have to make might be a good deal more acceptable if we knew that they were being accompanied by something else.

This was touched on by Senator Bingaman, that there is no question that the legislation and regulations have major impact on the management of major systems acquisition. But it seems to me the instability of program funding has just as great an adverse impact

on the Department of Defense to develop and produce these major systems.

We could probably waive all the acquisition laws and regulations we like and still have severe management problems under this pilot program because of funding instability. In such a case, we might never know how much potential for efficiency and effectiveness there would be from using these standard program management practices.

So how do you deal with this issue in carrying out your pilot program?

Mr. ATWOOD. You have hit upon one of the most serious problems that the Department faces, which we discussed at a meeting of about 100 program managers last month. The biggest complaint that the program managers had—was the lack of continuity of funding. They cannot count from one day to the next on the funding availability and therefore on the continuity in the program.

This comes about for many reasons. Every time there is a challenge to obtain funding, it seems that DOD is the source, and that does not come free. We end up reprogramming major program funds. This funding instability is a very serious handicap to the conduct of good, orderly program management.

Senator WALLOP. Thank you, Mr. Chairman.

Senator BINGAMAN. Senator Glenn.

Senator GLENN. Thank you, Mr. Chairman.

Mr. Atwood, in sections 103 and 110 of your proposal I believe it would allow you to increase the proportion of officers and senior enlisted personnel as the force draws down. Some years ago, before you came to your present position, we asked questions at one time—this has been about 4 years or maybe even 5 years ago now—about the officer-enlisted ratios.

This really started a tidal wave over at the Pentagon and I wound up over there in the Tank with the Joint Chiefs one day going back and forth on this thing. The upshot of the whole thing is, though, that not only did we find that the officer strength had increased too much, what came to be known at that time when we were debating it as brass creep, the ratios had changed significantly, but once they got into the cuts that we had proposed the DOD's own internal investigation resulted in 7,000 more officer cuts than we had even contemplated from our studies here.

So we are operating with a leaner, meaner force right now than we would have been previously and a couple of the members of the Joint Chiefs have been complimentary that where they thought it was micromanaging to begin with it was stuff that they should have done on their own had they been doing their job properly.

The point being you are asking now to waive these requirements. What is the rationale for this? Should not officers and senior enlisted personnel be reduced at a rate that is generally proportional to the overall reduction in strength? How does the request for authority improve the ability to manage personnel more efficiently?

Even more basic than that, how does it change combat capability? That is the bottom line.

Mr. ATWOOD. Let me just make a general comment and then I am going to ask Mr. O'Donnell to answer that specifically.

One of the biggest problems we have in the drawdown is to make sure that we do not draw down only at the lower levels, that we, in fact take a vertical slice, including flag officers, officers, enlisted men, and the lower-rank enlisted men and women. That is a basic tenet which guides our actions to reduce personnel.

Now for the specifics of what you asked, Terry.

Mr. O'DONNELL. Senator, I believe that the flexibility in the officer corps is dictated by the contemplated drawdown and an occasional bubble that you must deal with in a manner which is not inequitable.

The one-half of 1 percent authority above the end strength requirements of the law that our legislation proposal seeks, because the personnel experts in the Department have found it to be a useful tool in a personnel drawdown. It gives them a little more flexibility.

That proposal is contained in section 103. Section 110, which permits E–8 and E–9 end strength to be driven by available funding, is a request by the Department managers to have more flexibility to deal with the E–8 and E–9 levels.

Quite frankly, concerning section 110, I must rely on additional support provided by our personnel experts to go beyond that level.

Senator GLENN. Okay. I will not get into more detail. I will want to keep in touch with you on that and work with you on that one because we are very concerned that these ratios not get back out of whack again.

When we asked our questions before about officer strength, we got the biggest bunch of mush for answers. And then they went back and really scrubbed those officer accounts and found they really had grown where they should not have through the years. So we just do not want to see that happening again, so we will keep in touch with you on that.

Under your proposal to change procedures on up to six major defense programs, you would waive or have the authority to waive such things where the Government sort of sets the tone for the whole country—on things such as fostering the development of small and small disadvantaged businesses as an investment in our future, the commitment to fair treatment of workers through labor surplus area programs and wage standard programs.

Now would those be part of the things that you would waive?

Mr. ATWOOD. No, not at all. We simply would conduct our business as a commercial business conducts its business. They have the same kind of either in-house goals or targets that they have to meet, and we should not be excused from that at all.

Senator GLENN. Okay. Would any waiver change congressional oversight over any of these or our ability to oversee any of these programs?

Mr. ATWOOD. No. Quite the contrary, we consider those to be sacred goals, sacred targets. As you know, we report religiously on them. We might want to make some modification in the reporting structure, but there is no attempt on our part to cause any waiver of those.

Senator GLENN. Under section 201 you propose to delete the current multi-year requirements of demonstrating 10 percent savings and replace it with the term "substantial savings." But before we

get to that, you are also asking to delete the requirement that the current Five-Year Defense Plan fully funds the support costs associated with the multi-year procurement.

I do not understand why you would want to delete that requirement. What good is it to have the hardware without the support to back it up?

Mr. ATWOOD. May I just think a minute? [Pause.]

Mr. O'Donnell does not understand it. I am not going to take a cut at it. So I think we will have to get back to you.

Senator GLENN. Would you supply that for us for the record, please? That is obviously a very important one. I do not know why you would ask to delete the requirement, as I understand it, that the current FYDP fund the support costs associated with multi-year procurement.

Mr. ATWOOD. If these two gentlemen do not understand it, I positively am not going to say anything. We will get back to you on that, Senator.

Senator GLENN. Well, if you will get back to us, we will appreciate it very much.

[The information requested is included in the responses to questions for the record submitted by Senator Bingaman.]

Mr. ATWOOD. I would like to comment. You did say on the 10 percent or substantial. Ten percent of a large program or 5 percent of a large program is a substantial amount of money.

Senator GLENN. Well, that was going to be my next question. Could I just have one more question?

Senator BINGAMAN. Please ask any other questions you have.

Senator GLENN. 10 percent is a very specific number. You are replacing that with a requirement for "substantial savings." What is a definition of "substantial savings?"

Mr. ATWOOD. We need to work out with you a number that we all agree is substantial. A percentage of a small contract, 10 percent of a $1 million contract, is still a lot of money, but it is nothing compared with 5 percent of a $200 million contract.

Senator GLENN. Well, do you plan to make that a flexible figure depending on size of business or the type of product?

Mr. ATWOOD. I think we should set a dollar requirement.

Senator GLENN. A dollar amount rather than percentage?

Mr. ATWOOD. Yes.

Senator GLENN. Okay, fine. Thank you, Mr. Chairman.

Senator BINGAMAN. Did you have other questions? If you do, go right ahead.

Senator GLENN. I just had one more, if I might. I appreciate that very much.

The DMR plans significant savings in the area of logistics support. You stressed that in your opening statement, I believe, about the need for that, and much of the savings that we talk about comes from consolidating management information systems.

There have already been some very large investments in state-of-the art information systems by the services. In fact, the House of Representatives has commented formally on the Air Force Logistics Command's fielding of what they call "the most successful computer system in DOD history." It is my understanding of the study on the future DOD information system is that the Air Force is not

even participating in that study, that the Navy has been given the lead in that.

Have there been problems with the Air Force cooperating in that study? They have what is apparently the most successful system operating now.

Mr. ATWOOD. There are two things, and then I am going to let Mr. O'Keefe answer a little more in detail.

Number one is that every one of the services is participating in the studies. There are none of the services that I would consider to be non-cooperative. The Air Force is participating.

The focus is to develop compatible software systems. I do not think we complain at all about the capability of the hardware that we have purchased. I think that has been well known. But, the software programs are not compatible. We have a multitude of different software programs, which one could say have been developed and therefore do not cost anything, but we must continue to update them and it costs a fortune to continue to update them.

One of the biggest problems I see is non-compatible hardware, non-compatible software. Sean.

Mr. O'KEEFE. I think that very succinctly summarizes the problem with regard to the concern that you are raising about the working group or the folks who are putting together the input to this, each of the military departments has been asked and has participated in two different efforts we have under way. The first of these, under Secretary Atwood's corporate information management initiative, is by functional area, be it supply or civilian personnel, payroll costs or whatever, get together and compare notes, between each of the military department's requirements for what they need by that functional area.

There is a realization in those sessions that suddenly what you thought was unique and necessary for each military department is not substantially different from the other guy's requirements. So that is the kind of synergism we are hoping to get out of that.

The second aspect of what is going on is looking at ADP operations and design specifications. As you suggest, we are looking not only at the software part of it but also the hardware. There is no attempt in this particular case to look at jettisoning or dropping any of the hardware investments we have made thus far. The objective we are after in this particular section is to look at trying to make them compatible, as Secretary Atwood suggests, in the software packages themselves.

The difficulty we have now, and at the risk of oversimplifying it, is that within the Army, Navy and Air Force there is a different definition in each of the software packages on what a tank means. In the Army it is something with a turret on it; in the Navy it means you put fuel in, and the same kind of definition for the Air Force. So we are seeking to have the common kind of information systems that understand the same language as a software goal. That is not so much hardware-driven.

Senator GLENN. Thank you, Mr. Chairman.

Senator BINGAMAN. Let me ask one other question that occurs to me at this point, Mr. Atwood. The suggestion or proposal you have for a pilot program for up to six major defense programs, a couple of things there concern me. First of all, it is denominated a pilot

program, but the proposal is to make it permanent law and not to have any expiration in this.

That is my reading of it. I assume that is accurate. Do you know if that is the case? Usually when we think of a pilot program we think of something that lasts a couple or 3 years or some period and then terminates, but there is no proposal to ever terminate this.

Mr. ATWOOD. Well, I think you are right. If we call it a pilot program we need to set a termination date. It would be reasonable to assure that after the first 2 years of production that it would terminate.

Senator BINGAMAN. The other concern I have, which is more substantive, is that in 1986, we tried to help with the streamlining of the process and we directed the Secretary of Defense to establish so-called defense enterprise programs. This was to streamline reporting chains, to provide stable funding, to waive all the internal regulations.

We had a hearing a year or so ago where it became obvious in testimony that that authority was not being used and that in fact I think it is accurate to say that there has not been a single such program designated, at least since July 1 of last year, and that efforts at getting stable funding or designating such programs and treating them in any way differently from the rest just did not happen.

Is there something fatally flawed about that authority that we provided in 1986 that this will cure? Is there some reason why that was not usable but now this authority would be?

Mr. ATWOOD. There are two factors to it, and I think you hit on both of them. One is perhaps it did not go far enough in the kind of authority that we are seeking in this. But also within the Department there was not quite the ready acceptance to pushing forward the way it should have been.

We feel that the defense enterprise system probably should be folded into this pilot program.

Senator BINGAMAN. So you would take the authority that is already there under this defense enterprise program and enhance that with what you are asking for here, and then actually go forward and apply it to up to six programs.

Mr. ATWOOD. That is correct.

Senator BINGAMAN. That is the extent of our questions. As you can see, we have lost the membership here. Let me just say a few things here for the record.

We want to include your entire statement, whatever you would like included in the record. We would also like to include, so that we have a complete record, the DOD July 1989 Defense Management Report, DOD's January 1990 Implementation Progress Report, S. 2440, which is the Defense Management Improvement Act that has been introduced along with the Department's letter of transmittal and a sectional analysis, DOD's White Paper on the Congress, and DOD's press statements regarding these documents, and DOD's responses to the prehearing questions that we submitted.

So we will include all of that in our record so that we will have a complete record.

[The information referred to is attached as an appendix to this volume.]

Senator BINGAMAN. Mr. Atwood, I do want to thank you very much for testifying. I think we have had a useful exchange. I know your commitment to making progress in these areas is very genuine, and of course I think the concerns that were expressed by committee members is also very genuine.

I do think we want to work with you in taking the proposals that you have made and coming up with something which could be a well-documented package of acquisition reform that will reach the goals that I am sure we share. Thank you very much.

We will have one or two additional hearings on this package of proposals in the subcommittee.

Mr. ATWOOD. Thank you, Mr. Chairman. We will get back with some of these questions that we promised.

Senator BINGAMAN. Thank you very much.

The hearing is adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR JEFF BINGAMAN

ALTERNATIVE PERSONNEL SYSTEM

Senator BINGAMAN. In testimony before our subcommittee last year, Jim Woolsey described acquisition personnel reform as "the single most important set of reforms the Packard Commission recommended and the one on which all the others depend . . . ." The Packard Commission recommended the establishment of "an alternative personnel management, modeled on the China Lake Laboratory demonstration project." Please describe the manner in which the legislative proposals submitted by the Department of Defense and the Office of Personnel Management implement the Packard Commission's recommendation to establish an alternative personnel management system.

Mr. ATWOOD. The China Lake Laboratory demonstration project sought to improve mission effectiveness through an integrated approach to pay, performance appraisal, and position classification and by giving line managers greater control over personnel functions. The Office of Personnel Management legislative proposal, the Federal Pay Reform Act of 1990, is a comprehensive pay reform proposal that we support. We think that the proposed legislation will provide us with many of the flexibilities, through pay setting provisions combined with allowances and differentials, which were sought at China Lake. Pay for performance, a cornerstone of China Lake, has been completely incorporated into the legislative proposal, and the employee's performance is the basis for pay adjustments. Another pay issue which was vital to China Lake and which is incorporated into the legislative proposal is expansion of the authority to hire employees at salaries above the minimum rate for the grade for which they have been recruited based on superior qualifications. Recruitment and retention bonuses, which are a part of the legislative proposal, will offer supervisors and managers an advantage in recruiting and retaining employees, especially those in hard-to-fill occupations. The China Lake demonstration project included changes in the classification process which are not a part of the proposed legislation.

We are confident that the pay reform legislation will provide us with the flexibility we require to recruit and retain highly qualified employees and that, if passed, it will provide us with the intent of the Packard Commission recommendations.

ACQUISITION CORPS

Senator BINGAMAN. The Defense Management Report proposed enhancing the quality of the workforce through the concept of an acquisition corps. None of the provisions in the Department's legislative package directly pertain to the acquisition corps concept. Do you intend to request any legislation to enable the acquisition corps concept to be implemented?

Mr. ATWOOD. No, we can implement the acquisition corps within our current authority.

Senator BINGAMAN. The Department's response to the prehearing questions stated that "the Service Acquisition Corps would be designed to facilitate the development of experts in such distinct subspecialities as systems development, procurement and logistics. Beyond that guidance the services were allowed to include other specialities as desired. None were specifically directed for exclusion." The Department noted that, "Acquisition Corps selection [would be] primarily at the civilian GS/GM 13 level and 03/04 level for military."

Will all persons serving in systems development, procurement, and logistics billets at or above the GS/GM 13 and 03/04 level be in the acquisition corps?

Mr. ATWOOD. No. The acquisition corps concept is to develop personnel to fill "key" or "critical" acquisition billets. The size of the acquisition corps will be driven by the number of key acquisition billets each service identifies. It would not be practical or economical to intensively develop all personnel to fill a limited number of key billets.

Senator BINGAMAN. If not, what will be the differences between Acquisition Corps and non-Acquisition Corps personnel in those specialties in terms of education, training, advancement, and assignments.

Mr. ATWOOD. Any difference would be in the area of education, training, and assignment. Acquisition Corps members will have more mandatory training and education requirements to fulfill than non-Acquisition Corps personnel. In terms of assignments, emphasis will be on assigning only acquisition corps personnel to certain key or critical positions.

I will add that, though there is a great deal of emphasis on development of Acquisition Corps personnel, we are not neglecting those persons not in the corps. The USD(A) is in fact finalizing policy and minimum training, education, and experience standards for each of the major acquisition functional areas. These standards are directed at ensuring that the acquisition workforce as a whole is qualified and competent to perform its mission.

Senator BINGAMAN. Will civilians in the acquisition workforce not assigned to a military department be part of an Acquisition Corps?

Mr. ATWOOD. No. Not under the structure as we have established it.

Senator BINGAMAN. For each military department, please list each specialty which: (1) Will be reserved exclusively for persons in the Acquisition Corps? (2) Will have positions within the specialty that will be filled primarily by Acquisition Corps, but which will also have a substantial number of positions filled by non-Acquisition Corps personnel? (3) Is part of the acquisition workforce but which will be filled primarily without regard to whether an individual is within the Acquisition Corps?

*Army*

The Army has no military or civilian specialties that have been exclusively reserved for persons in the Acquisition Corps. However, members of the Acquisition Corps will be drawn from the following functional areas of branches:

*Functional area:* 51—Research and Development; 52—Nuclear Weapons; 53—Automatic Data Processing; and 97—Procurement.

*Branch:* 15/35—Aviation Intelligence.

Civilians will be drawn from the following career programs:

CP11—Comptroller; CP13—Supply; CP14—Contracting; CP15—Quality and Reliability Assurance; CP16—Engineer & Scientist (NC); CP17—Material Maintenance Management; CP18—Engineer & Scientist (RC); CP23—Automatic Data Processing; CP24—Transportation; CP25—Communications; and CP33—Ammunition Management.

*Navy*

Mr. ATWOOD. In structuring its Acquisition Corps, the Navy Department developed a program known as the Materiel Professional program focused on the preparation of personnel to fill the most important positions in weapons system acquisition. As a result the program is structured by organizational position rather than by specialty. For example, positions such as Program Executive Officer, Program Manager, Deputy Program Manager and other senior program management positions will be reserved for members of the Materiel Professional program.

Those in the Materiel Professional program, both military and civilian, are prepared by carefully managed career programs. Through mandated education, training, and experience, this program prepares people to assume the most senior acquisition positions. Membership in the Materiel Professional program is not limited by specialty. Military members will come from both the Unrestricted line as well as

Restricted line (Engineering Duty and Aeronautical Engineering Duty) communities. Upon selection for the Materiel Professional program, they will receive a subspecialty designator. Their careers will thereafter be managed through this designator. Civilians may come from many specialties including engineering, logistics, and contracting.

Therefore, while no specialty will have all of its positions reserved for members of the Materiel Professional program, some positions in many specialties will require the incumbent to be a certified Materiel Professional. Since the Materiel Professional program begins at the 03/GM-13 level, acquisition workforce positions below that level will be filled without regard to Materiel Professional status.

*Air Force*

The functions, or specialties, of program management, contracting, manufacturing, quality assurance, science and engineering, Business and finance, and acquisition logistics make up the primary functions that are part of the Air Force Acquisition Corps. (1) None of the specialities are reserved exclusively for persons in the acquisition corps. For example, the contracting specialty has personnel that work in operational contracting and are not included in the acquisition corps. (2) Specialities refer to career areas, such as quality assurance and engineering. Within each specialty (or career), positions that are involved in systems or modification acquisition will be specifically set aside for acquisition corps members. (3) All of the functions identified above, plus those listed in DOD Manual 5000.52-M, are included in the acquisition workforce. Only those persons in systems or modification acquisition will be reserved for acquisition corps members. All other positions will be filled by persons within those specialities meeting the qualification requirements of the position.

ACQUISITION EDUCATION

Senator BINGAMAN. Please describe the respective roles of the Defense Systems Management College (DSMC), the Industrial College of the Armed Forces (ICAF), and the National War College with respect to:

a. Providing professional training and education for the acquisition workforce.

b. Providing decisionmakers with an academic viewpoint on acquisition policy issues.

c. Developing historical information on acquisition policy issues.

Mr. ATWOOD. By charter, the primary purpose of the Defense Systems Management College is to conduct advanced courses of study in defense acquisition management. Among theses are the Congressionally Mandated Program Management Course, executive courses, and short courses.

DSMC has a Center for Acquisition Management Policy (CAMP) which provides expert advice and information on all manner of acquisition policy issues. In addition, DSMC has a highly qualified faculty who provide the academic viewpoint on the various aspects of acquisition policy issues.

Historical information on acquisition policy is analyzed, developed, and recorded by the college's CAMP and the research and information department.

Organizationally, DSMC falls under the Under Secretary of Defense (Acquisition).

The Industrial College of the Armed Forces (ICAF) is a unique senior-level college dedicated to the study of the resource component of national power and its integration into national security strategy. The ICAF curriculum is generalist in nature and addresses such subjects as mobilization and joint logistics, as well as acquisition topics.

The National War College focuses its curriculum primarily on joint warfighting.

Both ICAF and NWC come under the Chairman, Joint Chiefs of Staff and are not organizationally tied to the acquisition community.

Senator BINGAMAN. With respect to Acquisition Corps being developed by each of the military departments, please describe: The career points at which members will be assigned to resident professional military education.

*Army*

Mr. ATWOOD. The Army Acquisition Corps (AAC) is the Army's program for the development of a dedicated corps of acquisition specialists. Officers will typically enter the program at their 8th year of service. Generally, officers will attend Command and Staff College (CSC) between their 12th and 13th year of commissioned service, the Program Management Course at the 16 year point.

*Navy*

The career path for members of the Navy Acquisition Corps is divided among two groups, both a part of the Materiel Professional program. For the first group, the Unrestricted Line Officer-Materiel Professional, selection for the corps will be during the 4th to 12th year of commissioned service. A pre-requisite for selection is either post-graduate education completion, selection for post-graduate education, or selection/completion of Nuclear Propulsion training or Test Pilot School.

For the second group, the Restricted Line Officers (Engineering Duty and Aerospace Engineering Duty), selection into the corps will be during the Restricted Line Qualification tour of duty at the 10th to 12th year of commissioned service. Post-graduate education will have occurred prior to corps selection.

All members of the Materiel Professional program, prior to their first acquisition related assignment, will attend a 4 week entry level acquisition course. At about the 16th year of commissioned service for the Unrestricted-Line Materiel Professional and the 18th year of commissioned service for the Restricted Line Officer, both will attend the Program Management Course (20 weeks) at the Defense Systems Management College.

*Air Force*

Eligibility for resident attendance at professional military education schools for all officers, in the acquisition corps or not, is as follows: To attend Intermediate Service School, an officer must be a major or major selectee and must not have been selected for promotion to lieutenant colonel (however, those promoted to lieutenant colonel may attend as scheduled if they are within 60 days of reporting to a school assignment when promoted). Officers are eligible for resident Senior Service School from the time they are selected to lieutenant colonel up to 21 years of service.

Senator BINGAMAN. With respect to Acquisition Corps being developed by each of the military departments, please describe the institutions that will provide such education at each such point.

*Army*

Mr. ATWOOD. Army officers primarily attend Command and Staff College at Fort Leavenworth, Kansas. Some officers may attend a sister service school [Air Command and Staff College, Montgomery, Alabama (AF) or Naval War College, Newport, CT (Junior Level)] or the Armed Forces Staff College in Norfolk, Virginia. The Program Management Course is given at the Defense Systems Management College (DSMC) located at Fort Belvoir, VA. Army officers customarily attend Senior Service College at the Army War College, Carlisle Barracks, Pennsylvania, however, they may be selected to attend a sister service War College or the National Defense University, Washington, DC.

*Navy*

Mr. BETTI. The institution that will provide post-graduate education will normally be the Naval Postgraduate School, Monterey, CA. Some officers may receive education in other U.S. Navy approved institutions. Entry level instruction will be provided by the Defense Systems Management College, Fort Belvoir, VA. The Program Management Course will be at the Defense Systems Management College, Fort Belvoir, VA.

*Air Force*

Mr. ATWOOD. The majority of majors in resident Intermediate Service School (ISS) PME are assigned to Air Command and Staff College (Maxwell AFB, AL) Other ISS programs include Army Command and General Staff College (Fort Leavenworth, KS), Navy Command and Staff College (Quantico, VA), Royal Armed Forces Staff College (Bracknell, United Kingdom), U.S. Marine Corps Command and Staff College (Quantico, VA), Canadian Forces Command and Staff College (Toronto, Canada), U.S. Army School of the Americas (Fort Benning, GA), German Armed Forces Federal Staff College (Hamburg, West Germany), Peruvian Senior Service School (Lima, Peru), and Venezuelan Air Command and Staff College (Caracas, Venezuela).

Senior Service Schools (SSS) for lieutenant colonels/colonels include Air War College (Maxwell AFB, AL), National War College (Ft. McNair, Washington, DC), Industrial College of the Air Force (Ft. McNair), U.S. Army War College (Carlisle Barracks, PA), U.S. Navy War College (Newport, RI), NATO Defense College (Rome,

Italy), French Air War College (Paris, France), Australian Joint Staff College (Canberra, Australia), Japanese National Defense College (Tokyo, Japan), and Inter-American Defense College (Ft. McNair).

Officers also receive SSS credit for assignments to the National Defense University Senior Research Fellows Program and the Harvard Research Fellows Program.

Senator BINGAMAN. For fiscal year 1991, please provide the following for ICAF, NWC and DSMC: The anticipated number of students that will take courses. (Please distinguish among students taking resident courses, short courses on campus, and short courses in the field.)

Mr. ATWOOD. The planned number of students for fiscal year 1991 is 223 for ICAF and 168 for NWC. The ICAF and NWC courses are resident only.

The anticipated number of DSMC students in fiscal year 1991 for courses currently scheduled are:

a. PMC on campus: 720

b. Short courses on campus: 2,453

c. Short courses in the field: 2,728

Senator BINGAMAN. Please provide the anticipated number of students in each such category whose recent assignments have been in acquisition workforce positions.

Mr. ATWOOD. During fiscal year 1991 we project over 200 students with an acquisition background at Defense Systems Management College, 22 at Industrial College of the Armed Forces and 5 at National War College.

DSMC does not have specific information on any students coming in fiscal year 1991, but could make a projection based upon the fiscal year 1989 Program Management Courses' students and the fiscal year 1989 short courses' students.

a. PMC on campus: 641 of 720 (93.8 percent)

b. Short courses on campus: 1,719 of 2,453 (79.8 percent)

c. Short courses off campus: 2,048 of 2,728 (82.6 percent)

Students from several non-DOD agencies (CIA, FAA, GAO, DODIG, etc.) were not included as having been in acquisition workforce positions.

Senator BINGAMAN. For fiscal year 1991, please provide the planned number of full time faculty.

Mr. ATWOOD. The planned number of full time faculty will be 57 at ICAF and 36 at NWC.

The planned full-time faculty at DSMC is 161 assuming all authorized positions are filled.

Senator BINGAMAN. For fiscal year 1991, please provide the following for ICAF, NWC and DSMC: The planned number of full-time faculty who are experts in acquisition policy.

Mr. ATWOOD. Of the 57 instructors at ICAF, seven are graduates of the Defense Systems Management College Program Manager Course. Sixteen others have extensive experience in acquisition related areas of research and development, supply, and logistics. The staff of 36 instructors at NWC does not include an acquisition policy expert.

Of the 161 full-time faculty at DSMC for fiscal year 1991, there are 157 who are considered experts in their area of acquisition policy. The other four faculty are professors of behavioral science, education, or education technology who provide their unique skills and expertise to DSMC to improve the quality of the education given.

SUPPORT STAFFS

Senator BINGAMAN. As part of the Goldwater-Nichols Act, Congress reduced the number of personnel assigned to the headquarters functions of the military departments and to the Defense Agencies and Field Activities. Section 309 of the Department's legislative proposal would repeal the personnel ceilings contained in the Goldwater-Nichols Act.

At a time of significant anticipated personnel reductions, what force structure changes are under consideration that would require increases in support staffs?

Mr. ATWOOD. The Department of Defense has requested the lifting of all statutory ceiling constraints in order to achieve maximum management and organizational flexibility. Using the precepts identified in the Defense Management Report, we are restructuring the organization and operations of the Defense Department in order to achieve the most responsive, capable, and efficient National Defense capability.

Currently, we can't say where or how a lot of these force structure changes will take place. We are working on the issues and improvements that will decide those changes. However, we do want to avoid artificial organization ceilings that would prohibit us from making the most intelligent decisions on where to put missions or

functions. What we are asking for is the flexibility to organize the Defense Department in the most efficient, economical, and responsive manner.

Senator BINGAMAN. Which specific organizations do you anticipate receiving increases if this legislation is approved?

Mr. ATWOOD. It is conceivable that, in a few unique instances, some modest increases may be appropriate as we realign functions and manpower resources in a manner calculated to provide for the most efficient and effective organization and management of DOD programs and activities. I believe that as a result of some Defense Management Report initiatives, there may be shifts in workload and functional responsibilities from the military services to the Defense Agencies, with attendant increases in Management Headquarters levels. These actions would result in less costly overall DOD operations, but increases in specific Defense Agencies. We also expect significant decreases in other selected areas and Defense Components. What we are asking for in this legislation is the flexibility to make intelligent choices without statutory ceilings imposing artificial impediments to the development of such managerial arrangements.

### LAWS SUSPENDED BY THE ETHICS REFORM ACT OF 1989

Senator BINGAMAN. At a hearing of this subcommittee on March 21, Under Secretary Betti was asked for the administration's views on whether the laws suspended by the Ethics Reform Act of 1989 should be retained, repealed, or modified. He was unable at that time to provide us with the administration's position. We still have not heard from the administration. When will the administration forward its recommendations to the Congress?

Mr. ATWOOD. This effort is being led by the Office of Federal Procurement Policy. Therefore, we recommend that you direct this question to the Office of Management and Budget.

### MULTIYEAR CONTRACTING ENHANCEMENT

Senator BINGAMAN. The Department's proposal repeals a requirement in current law that a proposed multiyear contract achieve a 10 percent savings compared to the cost of annual contracts or current negotiated contracts. It also replaces the requirement in current law for "reduced total costs under the contract" with a requirement for "substantial savings of the total anticipated costs of carrying out the program through annual contracts."

Does the proposed standard—"substantial savings"—refer to savings as a percent of total costs or to savings that are "substantial" in the terms of a specific dollar amount?

Mr. ATWOOD. Multiyear contracting attempts to achieve real budget authority savings through improved stability and production efficiencies thereby allowing the Department to buy more program with limited budget authority. The goal is to achieve substantial dollar savings relative to the value of the contract rather than a fixed percentage.

Senator BINGAMAN. What is the range of savings that the Department would consider to amount to "substantial savings?"

Mr. ATWOOD. It is difficult to provide a single basis for "substantial savings" since the level of savings is dependent on the value of the contract. The current fiscal year 1986-1989 F-16 aircraft multiyear contract, that projected savings of approximately 8 percent in the fiscal year 1985 budget, has saved $467 million over the 4 year period. Smaller contracts, such as the proposed fiscal year 1991-1994 MK-45 Gun Mount multiyear contract which projects savings of $48 million, will generate lower savings. The Department feels that the most economic acquisition strategy available should be pursued without regard to the percentage saved.

Senator BINGAMAN. What programs in the fiscal year 1991 budget would receive multiyear contracts if the percentage threshold is repealed?

Mr. ATWOOD. Three programs are included in the President's budget as multiyear candidates that do not meet the savings threshold: Avenger (Pedestal Mounted Stinger), LCAC Landing Craft, and the LHD Amphibious Assault Ship.

Senator BINGAMAN. What savings can be achieved through multiyear contracts for these programs?

Mr. ATWOOD. The percentage savings for these programs range from 7 to 9 percent. The expected savings for these programs are $298 million. These programs are priced in the budget as multiyear contracts. Disapproval of these programs as multiyear contracts because they do not meet the savings conditions will increase the need for budget authority.

Senator BINGAMAN. Please provide examples of previous procurements in which substantial savings could have been achieved through multiyear contracts but which were not approved because they could not achieve the statutory savings percentage?

Mr. ATWOOD. The Congress denied multiyear procurement authority for the F/A-18 in Public Law 101-165 in part because of it failed to meet the 10 percent savings threshold. Although there was a 5.5 percent cost avoidance of the multiyear proposal over the annual contract, the savings were projected to be $372.3 million. This is an example of a multiyear candidate with substantial savings denied in part because it fell below the savings threshold.

Programs are evaluated for multiyear candidacy against potential savings as well as the other four criteria in Title 10 of the U.S. Code: stability of requirements; stability of funding; stability of configuration; and confidence in cost estimates. Evaluation of programs for multiyear procurement should involve all the criteria. The use of a fixed savings threshold does not recognize risk considerations and ensures that potentially low-risk savings will be lost.

Additionally, prior to the statute requiring 10 percent savings on multiyear procurement programs, the Department proposed, and Congress approved, multiyear programs with estimated savings below 10 percent. Some examples are the F-16, UH-60, T-700 engine, M-1 tank chassis, and MK-46 torpedo. If these programs and others had been denied because they did not meet the 10 percent savings requirement, hundreds of millions of dollars in savings would have been forfeited.

Senator BINGAMAN. Multiyear contracts provide stability by fixing contract terms over a long period, but because such contracts typically are based upon long-term commitments to specific quantities and early procurement of tooling, equipment, and parts, they also reduce the Government's flexibility in the out-years to meet changes in the threat and overall funding level. In light of the rapidly changing threat, funding reductions, and the difficulty the Department has faced in putting together a Five Year Defense Plan, what is the Department's basis for anticipating that there be a significant number of programs in the next few years that can take advantage of multiyear contracting?

Mr. ATWOOD. Five basic criteria in Title 10 of the United States Code are considered essential for approval of multiyear contracting. These criteria are: benefit to the Government, stability of requirements, stability of funding, stability of configuration, and confidence in cost estimates. Programs on a case-by-case basis will continue to be evaluated for multiyear contracting against these criteria. With the changes in the threat and funding reductions, criteria like stability of requirements and stability of funding will give the Department the necessary flexibility to identify programs as multiyear candidates.

Senator BINGAMAN. When consideration is given to terminating a program, we frequently hear about the difficulty of saving money because of the substantial termination costs that must be paid to the contractor.

What has been the trend in termination costs for multiyear contracts compared to termination costs for annual contracts for similar items?

What specific guidance is used for the manner in which termination costs are considered when comparing annual and multiyear contracts?

Mr. ATWOOD. Termination costs are funded in multiyear contracts and budgeted with funds for the purchase of economic order quantity materiel usually over a 3 to 5 year period. Termination costs are funded in annual contracts and budgeted with funds for the purchase of materiel for a certain lead time usually not more than 1 year. There has not been an increasing trend in paying termination costs for canceled or disrupted multiyear contracts because DOD has a good record of preserving them.

Criteria used to compare termination cost on annual and multiyear contracts usually focus on stability of requirements, stability of funding, stability of configuration, confidence in cost estimates and confidence in the contractor's ability to perform.

Senator BINGAMAN. The Department's proposal would repeal the current requirement that the current Five Year Defense Program fully funds the support costs associated with the multiyear program. The Department's proposal also would repeal the current requirement that a proposed multiyear contract provide for production at not less than minimum economic rates given existing tooling and facilities. Please provide examples of problems that the Department has encountered with these two provisions of law.

Mr. ATWOOD. It is administratively burdensome to require the Secretary of Defense to certify the current five-year defense program fully funds the support costs associated with the multiyear program before a congressionally approved multiyear

contract can be executed. Stable funding is one of the five criteria in Title 10 of the U.S. Code considered essential for multiyear contracting. Using this criterion to identify multiyear candidate programs, the Department places adequate emphasis on reviewing whether the current five-year defense program fully funds the multiyear candidate's support costs. There is no need to require additional certification following the multiyear candidate's thorough review in the Defense Department and in Congress. Examples of problems which permeate each multiyear program that undergoes support cost certification are the delays in executing the multiyear contracts until the certification is signed by the Secretary.

There are no examples of problems with the law requiring economic production rates on multiyear contracts. The law is not necessary because it is longstanding DOD policy that a proposed multiyear contract provide for production at not less than minimum economic rates.

Senator BINGAMAN. The Department's proposal would repeal the current prohibition against the use of multiyear contracts for military construction projects and automatic data processing equipment if the Secretary determines it to be "in the national interest."

What is the difference between the "national interest" standard and the "substantial savings" standard?

Mr. ATWOOD. The Department views "national interest" as an addition to the "substantial savings requirement. Sometimes it make sense to use the multiyear contract approach for other reasons in additions to "substantial savings." In the case of military construction, it may be prudent to award a multiyear contract to a single contractor to ensure a critical "national interest" project is successfully completed on time. We have used this approach several times in the recent past: Ft. Drum, Travis AFB Hospital, and the Defense Intelligence Agency facility at Bolling AFB, for example.

ADP procurements have a different focus than that normally associated with weapon system procurements. ADP is most often bought off-the-shelf. However, deployment of large Automated Information Systems (AIS) to multiple installations occurs over several years and that aspect of program implementation is very critical. The benefits to AIS deployments from multi-year procurement authority are that implementation schedules and funding requirements can be stabilized, reducing overall life cycle costs. This includes obtaining the most economic unit prices through a single contract action; less schedule slippage and adjustments in training and other support costs; and improvement in mission support and more timely capture of program benefits.

The introduction of this proposal should not be construed as a desire by the Defense Department to do a lot of multiyear contracts for military construction or automatic data processing equipment but rather that it gives our contracting officers an additional tool by which to procure these items when the situation is appropriate.

Senator BINGAMAN. Are there examples of recent construction and data processing procurements in which substantial savings could have been achieved through the use of multiyear contracts?

Mr. ATWOOD. We have no information available concerning recent procurements that would have benefited from this proposal. Again, we are simply trying to provide the opportunity for contracting officers to have this procurement strategy available should the situation be appropriate for using a multiyear contract for these facilities and equipment.

Senator BINGAMAN. The Department's proposal would repeal section 9021 of last year's Defense Appropriations Act. The limitations in the Appropriations Act apply to funds appropriated for fiscal year 1990. Do you have specific plans to enter into new multiyear contracts with fiscal year 1990 funds if these limitations are repealed? If so, which programs would be given new multiyear contracts using fiscal year 1990 funds?

Please list each provision of section 9021 that provides examples illustrating the basis for your request.

Mr. ATWOOD. The Department does not have specific plans to enter into new multiyear contracts with fiscal year 1990 funds if limitations to section 9021 are repealed.

The requirements in section 9021 are administratively burdensome. Defense Department multiyear justification material already provides details on the total program cost, expected savings with the savings percentage, estimated cancellation ceilings where relevant, impact of the multiyear contract on the industrial base, degree of risk involved with each of the six criteria for multiyear procurement in Title 10 of U.S. Code, and provides an analysis of the multiyear savings in terms of

then year, constant year, and present value outlays. If the program is congressionally approved and achieves the savings projections proposed in the budget, the multiyear contract should be executed without further approval requirements. The Department will not execute a multiyear contract without notifying Congress if the multiyear justification projections are not met. The Department will continue to provide the Congress with advance notification of any revisions to the approved multiyear program.

COMMERCIAL STYLE ACQUISITION PRACTICES

Senator BINGAMAN. The Department's proposal authorizes waiver of virtually all procurement laws in order to establish "commercial-style" procedures. Please list the statutes that would be preempted by the proposed commercial style acquisition procedures.

Mr. ATWOOD. This statute prescribes detailed procedures for the solicitation, evaluation, and award of contracts for commercial products that are designed to fosters greater competition in connection with the acquisition of commercial products. These detailed procedures would be used in lieu of any inconsistent procedures set out in sections 2304, 2305, 2319 of Title 10, United States Code, and corresponding sections of the Federal Property and Administrative Services Act of 1949, section 8 of the Small Business Act and section 18 of the Office of Federal Procurement Policy Act.

In addition, the following are some examples of the types of laws that would not apply to the procurement of commercial products pursuant to section 202:

Laws requiring terms and conditions to be included in contracts and laws that relate to a contractor's performance of a contract:

10 U.S.C. 2323—Commercial Pricing certificate for Spare and Repair Parts
Section 8(d) of the Small Business Act (15 U.S.C. 637(d))
10 U.S.C. 2384—Identification of Supplier and Sources
41 U.S.C. 701—Drug Free Workplace.
31 U.S.C. 3901-3907—Prompt Payment
10 U.S.C. 2313—Examination of Records
31 U.S.C. 1352—Lobbying
41 U.S.C. 351-358—The Service Contract Act
26 U.S.C. 6050M—Taxpayer Identification
Section 26 of the OFPP Act (41 U.S.C. 422)—Cost Accounting Standards Board
41 U.S.C. 22—Interests of Members of Congress
10 U.S.C. 2207—Gratuities
10 U.S.C. 2306(b), 41 U.S.C. 254(a)—Covenant Against Contingent Fees
10 U.S.C. 2402—Restriction of Subcontractor Sales
41 U.S.C. 51-54—Anti-Kickback Act

*Preferences:*

Sections 8(b)(7) and 15 of the Small Business Act
P.L. 101-165, section 9009—Domestic Source Restrictions
10 U.S.C. 2507—Acquisition of Foreign Machine Tools & Valves
41 U.S.C. 10—Buy American Act
50 U.S.C. 404—Mandatory Source Requirements
10 U.S.C. 2361—Military Transportation Act of 1904
Section 901 of the Merchant Marine Act of 1936 (The Cargo Preference Act of 1954 (46 U.S.C. 1241)
Section 8(a) of the Small Business Act
Any other source restriction, preference, or mandate included in any authorization or appropriation act.

Senator BINGAMAN. For each such statute, please describe the manner in which the statute constitutes an impediment to the acquisition of off-the-shelf products.

Mr. ATWOOD. The difficulties with the existing procedures, including those required by the OFPP Act, CICA, and the Small Business Act, are the rigidity they impose upon the process which is inconsistent with commercial buying practices. This rigidity is the major impediment to the Government's efficient acquisition of commercial products and the reason for over-specification and burdensome cost, price, and technical data demands. The traditional approach to product acquisition requires contracting officers to attempt early in the acquisition process, to define the agency's minimum needs in detailed specifications and to emphasize low price as the basis for contract award. Because formal competition does not begin until a solicitation for offers is issued, contracting officers have limited ability to screen products for suitability and quality after they become familiar with the products of those sources that will actually participate in the procurement.

This traditional approach to conducting competitive procurements does not work well in the commercial market where firms compete as vigorously on technology, performance and other aspects of quality as they do on price. As a result, the Government is unable to take advantage of the efficiencies and fast pace of technological development and product differentiation that are inherent in the commercial market. Legislation is needed that clearly authorizes contracting officials to exercise the procedural flexibility necessary to effectively research the capabilities and attributes of the products available from sources interested in participating in a particular procurement. Contracting officials need the discretion to integrate that research with specifications development in a competitive process that allows those activities to proceed concurrently rather than in series, as they do traditionally. Such procedural flexibility is critical to the Government's taking advantage of the vigorous competition that occurs in the commercial market. Without statutory authorization, commercial style practices such as the use of commercial market acceptance criterion, evolutionary specification development, pre-evaluated product lists, and award without discussion are subject to legal challenge. By seeking clear authorization for these practices in paragraph d of section 202, we are attempting to avoid the legal disputes which have plagued previous efforts to improve commercial products acquisition.

The other impediments addressed by 202 fall into two categories, socio-economic and restricted source requirements. Socio-economic statutes can constitute an impediment to the desirability of doing business with the Government. If a firm has a successful business on the commercial market, it may not appear to be desirable to seek government business when such business carries with it a need to comply with special requirements that can be disruptive to existing business methods and which may even specify penalties for noncompliance. Ideally, the Government should acquire commercial products in the open market just like any other customer. The presence of restricted source requirements can either preclude the sale of commercial products to the Government or require the contractor to manufacture special items for the Government. An example could be the use of foreign specialty metals in the purely commercial item.

Senator BINGAMAN. How would the commercial-style procedures under the Department's proposal differ from the current procedures applicable to acquisition of commercial products by the Government?

Mr. ATWOOD. The procedures would differ in that:

—a requirement for proven acceptance in the commercial market could be used to initially screen products for suitability and quality. Provisions are included for current government suppliers who do not have a commercial market.

—rather than fully developing the specification prior to soliciting an item, a basic specification could evolve during the competitive process based on the actual product information submitted by interested sources.

—for repetitive buys, a list of pre-evaluated products could be established. These lists would remain open; however, an impending buy would not be delayed while a new product underwent evaluation.

—contracts could be awarded to other than the lowest bidder without conducting discussions, based on evaluation criteria set out in the solicitation.

Senator BINGAMAN. In the private sector, commercial relationships are governed by the Uniform Commercial Code and a wide variety of Federal and State laws governing product safety, trade restrictions, intellectual property, occupational health and safety, and similar matters. Is it your intent that the proposed commercial-style procedures would impose on the Government, rules not currently applicable to government contracts, which regulate transactions in the private sector?

Mr. O'DONNELL. No, it is not our intent to subject the Government to new requirements not currently applicable to government contracts. The adoption of the commercial style procedures should not impose new rules to the interpretation of government contracts. Under longstanding case law courts and boards have applied Federal law to government contracts in recognition of the need for nationwide uniformity in Federal Government contracting. The fact that the contract is awarded using commercial-style practices does not change the basis upon which the courts have applied Federal law to Federal Government contracting.

Senator BINGAMAN. Section 217 of the Department's legislative proposal governing the pilot program for major defense acquisition programs, also proposes exemption from procurement laws, but specifies that waiver is not authorized for laws that "assure the financial integrity for the conduct of government programs" and laws governing the authority of the Inspector General. There is no similar provision in the commercial-style acquisition proposal. Is it your intent that the commercial-style acquisition procedures would preempt laws designed to assure financial integ-

rity for the conduct of government program and the authority of the Inspector General?

Mr. ATWOOD. It is not our intent to preempt these laws. These laws are not exempted by section 202 because they do not (1) prescribe terms and conditions to be included in contracts, (2) prescribe preferences to be given to any source or class of sources or mandate a particular source or class of sources, or (3) prescribe requirements to be imposed on the contractor that relate to the contractor's performance.

Senator BINGAMAN. Although the Department proposal concentrates on commercial products, there is language in the proposal which would extend commercial-style procedures to any product that "has been satisfactorily supplied under current or recent contracts for the same requirements."

Please provide examples of items that are not commercial products that would fall within the term "satisfactorily supplied under current or recent contracts."

Mr. ATWOOD. The above quoted phrase refers to the commercial market acceptability procedures. The items we are describing in this case are noncommercial items only by virtue of the fact that they are described by military specifications. As we convert mil-spec items, with commercial counterparts, to commercial item descriptions containing commercial market acceptance requirements, we could unnecessarily eliminate historical DOD-only suppliers of the equivalent mil-spec item. To avoid this situation, we have made provision for these suppliers by allowing commercial market acceptability to be waived for contractors who have "satisfactorily supplied under current or recent contracts." These suppliers must meet the new commercial item description and compete with commercial suppliers. We are currently converting military specifications to commercial items descriptions for such commodities groups as medical, clothing, food, etc.

Senator BINGAMAN. Would the term "satisfactorily supplied under current recent contracts" apply to:

(1) a "major system" as defined in 10 U.S.C. 2302(5)?

(2) a "major defense acquisition program" as defined in 10 U.S.C. 2340?

Mr. ATWOOD. Not generally, it may apply to subsystems or components of major systems.

Senator BINGAMAN. If so, please list any current or recently procured major systems of major defense acquisition programs that would be eligible for procurement under the proposed commercial-style procedures in section 202 as items which had been "satisfactorily supplied under current recent contracts."

Mr. ATWOOD. Not applicable.

Senator BINGAMAN. If the authority in section 202 had been in effect:

(1) Which current or recent procurements of noncommercial items would have been good candidates for the use of this authority?

Mr. ATWOOD. Some examples include: paint spray guns, underwear, a shotgun, a gasoline lantern, ear plugs. These items are not intrinsically noncommercial, they are noncommercial because they have been historically described by military specifications.

Senator BINGAMAN. What specific problems were encountered in the procurement of those items which could have been avoided or mitigated through use of commercial-style procedures?

Mr. ATWOOD. Each of the above items are described by detailed military specifications that evolved in detail as a result, in many instances, of buying poor quality products using less restrictive specifications—products which had not gained acceptance in the commercial marketplace. In converting these mil-specs to commercial item descriptions, there is a fear that these poor quality products will be supplied again. Using a commercial market acceptance requirement makes the simplification of a specification possible. Permitting DOD-only suppliers, that have provided acceptable products under recent or current contracts, to compete on an equal basis with commercial suppliers is fair and reasonable, since those products have been proven suitable despite not having a commercial market.

Senator BINGAMAN. The proposal would authorize restrictions on competition through the establishment of a "list of sources" allowed to bid on specified items. A list could be established and maintained for a period of years, and any firm that is not on the list could not participate in a subsequent procurement.

What is the difference between the authority to establish a "list of sources" under the Department's proposal and the authority to establish a qualified products list, a qualified manufacturers list, or a qualified bidders list under 10 U.S.C. 2319?

Mr. ATWOOD. Under the proposed procedures the list would be open. A firm not on the list could get on at any time and would probably miss only the immediate buy, since a buy will not be held up pending product evaluation but could compete on subsequent procurements. I would emphasize that the length of contracts or the

frequency of procurements would not change as a result of 202. Establishing a qualified products list/qualified bidders list must be justified on a specification basis, specifying why it is necessary to demonstrate compliance with a requirement prior to contract award. A qualification requirement is limited to a "requirement for testing or other quality assurance demonstration." A qualified manufacturers list involves an audit of a manufacturers facility to evaluate technical capabilities, quality control methods, etc. As a result, these procedures are limited to critical items or items requiring extensive testing and are not appropriate for most commercial products. Under 202 the cost of evaluation would not be borne by the contractor as opposed to the development of a qualified products list where costs are paid by the contractor unless there are insufficient qualified sources.

Senator BINGAMAN. What problems, if any, has the Department encountered in the administration of section 2319 that would be addressed through use of a "list of sources" under the Department's proposal?

Mr. ATWOOD. Under the Department's proposal, a list of sources of pre-evaluated products could be used for any commercial product and would be most useful for repetitive purchases of basic commodities. Justification for a pre-evaluation requirement on a item by item basis would not be necessary.

Senator BINGAMAN. What provisions in the current law have led you to ask for authority to use a list of sources?

Mr. ATWOOD. Current law authorizes the use of lists of products and sources only in those limited circumstances where extensive product testing, product criticality, or facility audits are involved.

Senator BINGAMAN. Please provide examples of recent procurements in which the Government was unable to use the authority in section 2319 but would have used the authority to establish a list of sources to conduct such procurements, and please provide examples of recent procurements in which the Government would have derived specific benefits through use of a list of sources.

Mr. ATWOOD. Use of the authority in section 2319 could not be justified for the majority of commercial or commercial-type items used by DOD, such as clothing, machine tools, air and refrigeration equipment, heating equipment, construction equipment, medical supplies. The benefits attained by using a list of sources of pre-evaluated products in buying these types of items are that such a list approach eases the solicitation process—faster response and faster, simpler evaluation of offers.

Senator BINGAMAN. What would be the maximum time, under your proposal, under which restricted list of sources could be used to exclude qualified firms from participating in a procurement or series of procurements?

Mr. ATWOOD. The list would remain open; however, an impending buy would not be stopped until evaluation of a new supplier was completed.

Senator BINGAMAN. Under the Department's proposed authority to restrict procurements to a "list of sources," the contracting officer would be authorized to "rotate among such sources" whenever the list of qualified sources is "extensive." The effect of this provision would be to exclude qualified sources from a procurement. Please provide examples of recent procurements in which the Government would have derived specific benefits through ability to rotate a procurement among sources.

Mr. ATWOOD. The purpose of the list of sources proposal is to make solicitation and award easier and faster for commercial products. For items, such as clothing and food, the list of sources could become so long that the purpose of establishing the list would be defeated. For this reason, the provision for rotating among sources on the list was proposed.

Senator BINGAMAN. The proposed law requires that a solicitation contain a "product description."

What is the difference between a "product description" and the provisions of current law requiring a description of function, performance, or design requirements?

Mr. ATWOOD. The product-description in the proposed law would be a short, narrative description of the item to be solicited, containing sufficient information so that a potential supplier can decide if he may be able to supply it. This product description is not substitute for the commercial item description or Federal specification which describes an item using salient characteristics in terms of function or performance.

Senator BINGAMAN. What differences, if any, would there be between use of a "product description" and use of the GSA Federal supply schedule program?

Mr. ATWOOD. The procedures in the proposed legislation are for single award contracts for relatively large quantities of a standard item, possibly to be stocked. This is as opposed to multiple award schedules which are for multiple suppliers when

small quantities and many varieties of an item are needed, to be delivered directly to a user. Prices for products on the multiple award schedules are negotiated based on sales data showing prices paid in the commercial market. Under section 202, head-to-head competition would ensure reasonable prices.

Senator BINGAMAN. What differences, if any, would there be between use of a "product description" and the Department's authority to use a qualified products list?

Mr. ATWOOD. A product description is a short narrative description of an item, suitable for use in a Commerce Business Daily announcement of an impending buy. A qualified products list is a list of pretested products meeting a specification which requires extensive testing or describes a critical use item.

Senator BINGAMAN. Please provide any examples of recent procurements in which the Government would have derived specific benefits through use of a "product description" announcement rather than a solicitation made under current law.

Mr. ATWOOD. The product description announcement would be used to perform market research and to establish a field of interested sources to either receive solicitations or to be included on a list to receive repetitive solicitations. What differs most from current practice is that the specification could change as a result of consideration of the product information submitted by sources in response to the Commerce Business Daily announcement. Product improvements and variations that become known at this stage of the acquisition process could be incorporated into the specification. This is especially useful for items where technology is continuously evolving and keeping specifications up-to-date is difficult, for example, automatic data processing equipment, scientific instruments, textiles, and cameras. However, these procedures would help us to take advantage of the advances and refinements that occur with any commercial product as a result of competitive forces.

Senator BINGAMAN. Under current law, a solicitation must include a statement of the relative importance assigned to evaluation factors. The proposal, however, merely requires a listing of evaluation factors.

What problems are presented by the current requirement that the Government develop, and that the offerors be informed of, the relative importance of evaluation factors?

Mr. ATWOOD. It was not our intent that the relative importance of evaluation factors would not be provided.

Senator BINGAMAN. Please provide examples of recent procurements in which the Government would have derived specific benefits if there had been no requirement to list the relative importance of evaluation factors.

Mr. ATWOOD. Not applicable see 9a.

Senator BINGAMAN. Under current law, competitions are conducted through either sealed bids or negotiations. The proposal is silent.

Will you use sealed bids, negotiations, or some new approach in these commercial-style acquisitions?

Mr. ATWOOD. We will use the commercial-style competitive procedures set out in paragraph d of section 202 in lieu of the current sealed bidding and competitive negotiation techniques.

Senator BINGAMAN. What standards will be used to select among these procedures?

Mr. ATWOOD. The commercial style competitive procedures set out in paragraph d of section 202 are preferred over current procedures unless the contracting officer determines another authorized method of acquisition is more appropriate.

Senator BINGAMAN. The Department's proposal authorizes establishment of a new bid protest forum on a 3-year test basis that would preempt the bid protest authority of the GAO and the Boards of Contract Appeals. Please describe any problems with the current forums and procedures that are relevant to this proposal.

Mr. ATWOOD. Under the current procedures, the GAO is allowed a period of 90 working days for protest resolution, during that time procurement action is stopped. In addition, GAO rules are burdensome and, as recently proposed, may become even more so. In resolving their own protests, as proposed, agencies will benefit from faster protest resolution, reduced loss of procurement time, and immediate feedback on inequities in actions. The capability of the Department to successfully resolve contract disputes is demonstrated by the Armed Services Board of Contract Appeals. We propose to demonstrate our capability to successfully resolve protests as well, without unduly delaying procurement action, which can be a burden for industry as well as the Department. There is no commercial counterpart to our protest system. The proposed procedures are meant to make our procedures for buying commercial products more "commercial-like."

RESCISSION OF COMMERCIAL PRICING CERTIFICATION REQUIREMENT

Senator BINGAMAN. The Department's proposal repeals the requirement that contractors providing spare and repair parts certify that the Government is receiving the lowest commercial price (10 U.S.C. 2323). Please provide the results of any studies or analyses comparing the benefits of the requirement with the burden of compliance.

Mr. ATWOOD. The Inspector General (IG) performed an audit of the commercial pricing certification (Commercial Pricing Certifications, Report No. 89-076) and recommended that the statutory requirement be repealed. The statute limits the requirement for certification to commercial spare or repair parts procured noncompetitively on awards of $25,000 or more. The IG found that the certification is not cost effective and, with only one exception, contracting officers consistently obtained the lowest commercial prices for spare and repair parts without obtaining certificates from contractors. Based on the results of the audit, the Department believes the administrative costs of obtaining the certificates are greater than any cost savings which may be derived.

Senator BINGAMAN. If this provision is repealed, what procedures will remain in effect to promote the acquisition of spare and repair parts at the lowest commercial price?

Mr. ATWOOD. As already stated, the IG found that contracting officers consistently obtained the lowest commercial prices whether or not a commercial pricing certificate is obtained. Additionally, in accordance with the Truth in Negotiations Act (10 U.S.C. 2306a), the Department must either obtain certified cost or pricing data for such noncompetitive contracts or obtain data to demonstrate that there is an established catalog or market price for the commercial item and that it is sold in substantial quantities to the general public.

Senator BINGAMAN. Section 2323 authorizes the Department to audit sales records in order to verify contractor certifications for the contracts covered by the section. With respect to noncompetitive procurements from commercial suppliers, what access to similar records is the Department of Defense otherwise entitled to by law or regulation?

Mr. ATWOOD. When cost or pricing data are required to be submitted, 10 U.S.C. 2306a provides the Department with the right to examine all records contractor or subcontractor related to proposing, negotiating, pricing, or performing the contract for the purpose of evaluating the accuracy, completeness, and currency of the data submitted. 10 U.S.C. 2313(a) also provides the Department with the right to inspect the plant and audit the books and records of contractors and subcontractors on cost-type contracts and subcontracts. A clause setting forth these rights is included in all negotiated contracts of $25,000 or more. Additionally, prior to granting an exemption from the requirement to provide certified cost or pricing data based on an established catalog or market price, the offeror must agree to grant access to records to permit government verification of sales provided to support the claim for exemption.

AWARDS WITHOUT DISCUSSION

Senator BINGAMAN. The Department's proposal amends the Competition in Contracting Act to permit awards without discussions when the award is based on "the greatest benefit to the United States considering factors such as price, quantity, design, performance, management capability, technical capability, or risk as stated in the solicitation."

Please describe the standards that would be used to distinguish between procurements in which discussions would be appropriate and procurements in which discussions would not be appropriate?

Mr. ATWOOD. In order to determine that award without discussions is appropriate, it must be clear to the source selection officials that one responsive proposal is clearly superior in technical approach at a fair and reasonable price.

When communication with an offeror is required regarding the acceptability of his proposal or to provide the offeror and opportunity to explain his proposal, discussions must be conducted. Discussions may include correcting or revising contract clauses or the terms and conditions.

Communications with an offeror for the sole purpose of eliminating minor irregularities or apparent clerical mistakes in the proposal is considered a "clarification," and a subsequent award without discussions would be possible.

There are no specific "standards" in the Federal Acquisition Regulation for distinguishing between procurements but there are conditions which would allow for the proper application of awards without discussions. Where there is a technically supe-

rior proposal and the price is fair and reasonable, further discussions lead to technical leveling and accusations of auctioneering.

Senator BINGAMAN. How would procurement officials know in advance of discussions that the discussions would not have a beneficial impact on the procurement?

Mr. ATWOOD. In order to make award without discussions a reasonable possibility, we must first put all offerors on notice that we reserve the right to make award based on their initial submission alone without further discussions. This motivates them to provide their best proposal first or risk losing the award. It is important to remember that the purpose of conducting discussions is not to "correct" a deficient proposal or engage in technical leveling among the offerors. Discussions are primarily to clarify the offeror's intent with regard to terms and conditions or technical specifications, and to identify specific weaknesses in the proposal. Upon receipt of initial proposals, we determine if the offerors understand our technical requirements. In addition, we must determine that the proposed price is fair and reasonable. If these conditions are met, there may be no reason to justify discussions or to request a "Best and Final Offer (BAFO)."

Senator BINGAMAN. Please provide examples of recent procurements in which the Government would have made an award without discussions but was required to conduct discussions under current law. For each such example, please explain why the discussions were not significant and describe the impact of the requirement for discussion on the timing of the procurement.

Mr. ATWOOD. Records have not been maintained on instances where we could have made an award without discussions but did not as a result of the GAO interpretation of CICA. In decisions rendered in 1988 and 1989 (e.g. B-230246 dated June 21, 1988, B-228468 dated February 3, 1988 and B-233208 dated April 4, 1989) GAO interpreted CICA to mean that an award can be made without discussions only to the low qualified offeror. We have followed the result of those opinions since that time.

### UNIFORM THRESHOLD FOR SOCIO-ECONOMIC REQUIREMENTS

Senator BINGAMAN. The Department's proposal establishes a uniform threshold of $25,000 for the application of the various socio-economic statutory requirements:

1. For each statutory requirement that would be amended by the Department's proposal, please describe:

a. The manner in which the proposal affects Department of Defense Procurements.

b. The current threshold.

2. What specific problems are presented for both government and industry by the fact that various socio-economic requirements involve different thresholds?

3. Do you have an estimate of the number of contracting actions and the volume of procurement dollars that:

a. Are subject to the socio-economic requirement under the current thresholds?

b. Are excluded by the current thresholds?

c. Would remain subject to the socio-economic requirements if a $25,000 threshold were established?

d. Would be excluded by a $25,000 threshold?

4. What is your estimate of the impact that this would have on the effectiveness of the specific socio-economic programs served by the statutory requirements.

5. Section 218 of the Department's proposal, concerning the Davis-Bacon Act, would raise the threshold under that act to $250,000. If the Department is proposing a uniform threshold of $25,000 for the other major socio-economic requirements, why have you proposed a separate, higher threshold under Davis-Bacon?

Mr. ATWOOD. This proposal was viewed as a first step toward procurement simplification. By consolidating multiple thresholds into a single one, we can eliminate the potentially confusing thresholds that currently exist. This should also be a significant benefit to small business because procurements below the small purchase threshold are reserved for small business firms. The effect that such programs have on DOD on an individual basis was not considered and we have no empirical data which can be used to judge the impact of this change on any individual program. The aggregate effect that multiple threshold on the complexity of the procurement process was the main consideration.

The Federal Procurement Data System does not stratify information on procurement actions below the $25 thousand threshold (the current small purchase threshold) for every socio-economic requirement. Based on statistics for fiscal year 1988, 230 thousand actions over $25 thousand with an aggregate value of $130 billion were awarded. These actions and dollars would be subject to the socio-economic re-

quirements. The number of actions with a value of less than $25 thousand was 14.5 million and had an aggregate value of $14.3 billion. We have chosen to use fiscal year 1988 data rather than fiscal year 1989 due to errors that appear to exist in the 1989 data base as result of programming difficulties.

The $250 thousand threshold proposed for the Davis-Bacon Act represents the position of the administration on that statute and is a compromise from bills submitted during the prior administration which called for a $1 million threshold. This threshold would exempt from the Davis-Bacon Act only 7 percent of the dollar volume of all federally financed contracts for construction, repair, and alteration. For DOD contracts, this threshold amounts to about 12 percent of dollar volume. Examples of the benefits that can be anticipated are: more interest by contractors in Federal construction (many contractors find the Davis-Bacon rates to be disruptive of local wage schedules) and a reduction in the volume of paperwork submitted to the Government.

### FEDERAL ACQUISITION REGULATORY COUNCIL MEMBERSHIP

Senator BINGAMAN. The Department's proposal authorizes the Under Secretary of Defense for Acquisition to delegate to an Assistant Secretary his responsibility to serve on the FAR Council.

If this authority is granted, is it your intent that the Assistant Secretary for Production and logistics would always represent DOD on the FAR Council, or would that official do so only when the Under Secretary or Deputy Under Secretary were unavailable?

Mr. ATWOOD. The proposal would authorize the Under Secretary to designate an official to represent DOD on a permanent basis at FAR Council meetings. The designated official will be at an organizational level no lower than an Assistant Secretary within the Under Secretary's office.

Senator BINGAMAN. How many times a year does the FAR Council meet?

Mr. ATWOOD. The FAR Council plans to meet on a quarterly basis.

Senator BINGAMAN. The DMR Regulatory Task Force reported that a substantial portion of the burden on the acquisition process is the result of self-imposed administrative regulations. The primary acquisition regulation is the Federal Acquisition Regulation (FAR). What is DOD doing, in terms of its responsibilities for issuance of the Federal Acquisition Regulation, to address this problem?

Mr. ATWOOD. The DOD is working with industry to identify and delete major acquisition policies, within the Federal Acquisition Regulation and the DOD FAR Supplement, that inhibit good business practices or do not add value. In addition, the Office of Federal Procurement Policy has begun a total review of the FAR. Under this 3 year effort, which began in December 1989, OFPP will provide recommended FAR revisions to DOD and to GSA for consideration and appropriate action. Under the Defense Management Report, DOD is also streamlining and reducing DOD-level issuances, which includes Directives and Instructions, the DOD FAR Supplement, as well as Military Department/Defense Agency supplements to the FAR.

### COMPETITIVE ALTERNATIVE SOURCE REQUIREMENT

Senator BINGAMAN. Under current law, the Department must develop an acquisition strategy for each major program prior to beginning full-scale development. Under the proposed legislation, the Department would not be required to develop an acquisition strategy until just prior to completion of full-scale development. Why does the proposal to the competitive alternative source requirement move the requirement for preparation of an acquisition strategy to a later point in the acquisition process?

Mr. ATWOOD. The current law requires submittal of an Acquisition Strategy Report (ASR) to Congress not later than the date of the submission of the President's budget to Congress for the fiscal year for which the initial request is made for appropriations for full scale development of the program. The law's timing is too early in the acquisition process, in some cases over 18 months prior to contract award, and sufficient data may not be available to complete a usable cost benefit analysis for the report to Congress or to make a dual source decision. The proposed change is an attempt to time the submission of an ASR to when sufficient data would be available yet early enough that we have decision flexibility.

Senator BINGAMAN. Under current law, dual sourcing is required for major systems and components unless the Secretary determines that this process should be waived. Under the proposal, dual sourcing is required only when dual sourcing "(A) would likely result in reduced costs for such program; (B) would not result in unac-

ceptable delays in fulfilling the needs of the Department of Defense; and (C) is otherwise in the national security interests of the United States."

a. As a practicable matter, what is the difference between the current authority to waive dual sourcing requirements and the proposed criteria for requiring dual sourcing?

b. Please provide examples of recent procurements in which use of the proposed criteria would have had an impact on the timing or substance of a procurement?

Mr. ATWOOD. The current statute assumes that dual sourcing is appropriate for most major systems and requires detailed justification when dual sourcing is not considered to be appropriate. The proposed statutory change recognizes that dual sourcing is not automatically suited to every major program and, in effect, requires that a cost benefit analysis be made on a case by case basis, prior to any decision to dual source. We have no information available concerning recent procurements that would have benefited from this proposal. We are attempting to make the best use of our resources in the future.

Senator BINGAMAN. In light of the changing threat and anticipated reductions in defense funding resulting in lower quantities, what changes, if any, do you anticipate in the use of dual sourcing?

Mr. ATWOOD. With the changing international threat to the security of the United States and anticipated reductions in defense spending, decisions to establish dual production sources must be carefully scrutinized in terms of realistic quantity predictions and cost effectiveness. There probably will be fewer situations where dual sources will be advantageous.

Senator BINGAMAN. In the fiscal year 1991 request, are there any major systems acquisitions that evidence potential for dual sourcing under the criteria contained in your proposal?

Mr. ATWOOD. Without being able to identify specific programs at this time, new dual production sources may be established for some programs. We are not proposing that dual sourcing be eliminated. Rather, we are trying to ensure that such decisions are carefully considered in the absence of any legally dictated presumptions.

### CERTIFIED COST OR PRICING DATA THRESHOLD

Senator BINGAMAN. The Department's proposal raises the basic threshold under the Truth in Negotiations Act (TINA) for certified cost or pricing data from $100,000 to $500,000. The proposal leaves in place the Department's authority to require such data below the threshold when necessary to determine the reasonableness of the contractor's price. Since contractors will need to maintain the data to demonstrate cost reasonableness, what specific impact will the change produce in terms of streamlining the acquisition process?

Mr. ATWOOD. When contracting officers need cost or pricing data in order to determine the reasonableness of the contractor's price, they will ask for the data prior to contract award, require certification of the data, and include a clause in the contract to ensure the right to a price adjustment if the data should later be found to be defective. If certified cost or pricing data are not requested, there is no need to maintain the data to demonstrate cost reasonableness.

However, cost or pricing data typically include historical accounting data. Contractors will certainly need to maintain historical accounting data for a variety of purposes even though they may not be required to submit certified cost or pricing data on a particular action.

This change will streamline the process by reducing the time spent in proposal preparation, proposal update, and proposal analysis. These time savings readily translate into dollar savings for the contractor, the buying activity, and the audit organization. Contractors will not be required to submit a very detailed pricing proposal of estimated costs by contract line item with supporting information adequately cross-referenced and suitable for detailed analysis. It will also not be necessary to continually review and update the data up to the date of agreement on contract price.

We must note that this provision would not conflict, in any way, with the contracting officer's ability to obtain the data whenever he thinks it is necessary. See 10 U.S.C. 2306a(c). Raising the threshold will not reduce necessary oversight.

Senator BINGAMAN. In terms of procurements in the $100,000–$500,000 range for the most recent year in which data are available:

a. What was the volume of such procurements in terms of number of actions and total dollar amounts in both absolute terms and as a percentage of total Department of Defense procurements?

b. What percentage of contracts were audited for cost or pricing data?

c. What percentage of such audits resulted in recovery for overcharges?

d. What was the total amount recovered?

Mr. ATWOOD. For fiscal year 1989, there were 25,278 prime contract actions covered by TINA within the $100,000–$500,000 range, with a total dollar value of $5 billion. These actions represented 66 percent of the total actions of $100,000 or more but only 7.9 percent of the total dollar value covered by TINA.

During fiscal year 1989, the Defense Contract Audit Agency (DCAA) performed 157 defective pricing reviews on actions falling within the $100,000–$500,000 range. This represents approximately .6 percent of the total contract actions within this dollar range.

DCAA found defective pricing during 84 of these reviews, or on 54 percent of the total reviews performed. DCAA has recommended price adjustments of 11.7 percent on these 84 actions, but we are not able to determine the actual amounts recovered because DCAA does not maintain those statistics. However, on average for fiscal years 1987 through 1989, contracting officers have sustained 54 percent of the price adjustments recommended by DCAA for actions of less than $500,000. Savings to DOD as a result of these suspensions have totaled 52.6 million for the 3 years.

Senator BINGAMAN. Please provide any studies or analyses that the Department has made or obtained that compare defective pricing in the $100,000–$500,000 range with the rate of defective pricing in other ranges.

Mr. ATWOOD. The Inspector General (IG) performed an audit of contract pricing (Summary Report on the Audit of Contract Pricing, No. 88-165) from July 1984 through September 1987 as a follow-on to the DOD-wide audit of spare parts. The same contractors which were found to have sold the Department unreasonably priced spare parts were audited to determine whether other contracts were overpriced as well.

IG statistics on this audit indicate that 50 percent of the contracts audited with a value between $100,000 and $500,000 were found to be defectively priced, and that the alleged overpricing represented 14 percent of the contract value. In total, there was alleged defective pricing on 9 of the 18 contract actions that were audited in the $100,000–$500,000 range. To date, seven of these nine actions have been settled by contracting officers with a recovery of $113,763, or 5.1 percent of the contract value for the seven actions.

Contracts included in this audit were not selected on a random or statistical basis. Rather, screening techniques were used to select actions that were known to have a high probability of being overpriced. As stated on page 2 of the final report issued by the IG: "Pricing actions were not selected for review on a statistical basis and no statistical inferences should be drawn from the results of the review."

The following data summarize the IG's findings:

| CONTRACT VALUE | NUMBER OF CONTRACTS TOTAL | OVERPRICED | % | OVERPRICING AS PERCENT OF CONTRACT VALUE |
|---|---|---|---|---|
| $100K-$500K | 18 | 9 | 50% | 14% |
| $500K-$1M | 60 | 28 | 47% | 6% |
| $1M-$5M | 129 | 74 | 57% | 4% |
| $5M-$10M | 24 | 19 | 79% | 3% |
| $10M-$25M | 26 | 19 | 73% | 3% |
| $25M-$50M | 12 | 10 | 83% | 4% |
| OVER $50M | 12 | 10 | 83% | 2% |
| | 281 | 169 | | |

Senator BINGAMAN. What is the basis for selecting $500,000 as the new threshold?

Mr. ATWOOD. That threshold reflects the impact of inflation which has occurred since 1962, when the threshold was established at the $100,000 level. Additionally, the $500,000 threshold would be the same as the threshold established for the application of Cost Accounting Standards requirements.

Senator BINGAMAN. In 1981, the threshold was raised to $500,000. The $100,000 threshold was reinstated in 1983. Please provide any studies or analyses that the Department has made or obtained with respect to that experience.

Mr. ATWOOD. We do not have any formal studies performed based on that experience.

Senator BINGAMAN. If this provision is enacted, what procedures will the Department use to ensure that contract prices are based upon costing data that is accurate, complete, and current?

Mr. ATWOOD. If the TINA threshold is increased, we anticipate that contracting officers will not require the submission of certified cost or pricing data for most actions valued at less than $500,000. However, contracting officers will still require contractors to provide adequate data to support proposals. In these situations, contracting officers will use approved forward pricing rates for labor and overhead to determine the reasonableness of proposed costs, and will obtain technical and audit inputs as considered necessary.

EXCEPTION TO COST PROHIBITION FOR CERTAIN OVERSEAS SEVERANCE PAY

Senator BINGAMAN. Which nations have laws that require severance payments that are higher than customary costs in the United States?

Mr. ATWOOD. This question cannot be answered without significant research and analysis of the labor laws of all the nations where DOD awards contracts that require the employment of local nationals. A cursory review, reveals that the following countries have either severance pay laws or firmly established, widely adopted severance pay practices: Japan, Germany, Spain, Turkey, and Greece.

One of the problems in answering this question is that even if countries are identified as having severance pay laws, additional analysis needs to be done for each labor category to determine whether the severance pay required by local law exceeds customary severance payments in the United States. Since there is no readily available standard as to what is customary severance pay in the United States, a survey of severance payments for each labor category would need to be done. To our knowledge, there is no government organization with the resources or data base to perform this task within a reasonable timeframe.

Senator BINGAMAN. What is the impact of the current law on Department of Defense acquisition practices overseas?

Mr. ATWOOD. Implementation of the provision limiting the allowability of severance pay for foreign national (10 U.S.C. 2324(e)(1)(M)) was incorporated in Federal Acquisition Regulation (FAR) sections 31.205–6, 37.110(f), and 52.237–8 on April 28, 1989. The full impact of this provision on DOD acquisition practices overseas will not be known until contracts awarded with the severance pay provision are completed or terminated. Such information is not yet available.

The Air Force has indicated that the current law will have a significant impact on negotiating Base Maintenance Contracts (BMCs). Local national (LN) labor is used on BMCs. Most host nation labor laws or practices require terminated employees to be paid substantial severance pay. The Air Force has indicated that it may not be able to award contracts for Base Maintenance services and may be required to perform the work with U.S. Government civilian employees. This would require a significant increase in personnel at our overseas bases.

The Army and the Air Force have been unable to determine what is customary U.S. severance pay for the labor categories that are used overseas. Severance pay in the United States is often determined geographically by industry, and involve other factors such as compensation and benefits. Evaluating severance pay by itself may be unreasonable. The socio-economic cultural values of some nations may place job security (and severance pay) ahead of weekly take-home pay in importance. To impose only one aspect of the U.S. compensation scheme on overseas contractors without reviewing the total compensation is unreasonable.

Situations are anticipated where severance pay is not required by host nation laws but local practices establish the amount of severance pay. In order to contract in a reasonable manner for services overseas, severance payments should be allowable based on conformity to criteria such as practices of other firms similar in size, in the same industry, and in the same geographic area. To use what is customary severance payment in the United States as the standard is arbitrary and likely to

result in not being able to obtain competent personnel on service contracts. To impose an undefined U.S. standard on overseas service contracts is unrealistic.

Senator BINGAMAN. Please describe any examples of problems caused by current law and the manner in which such circumstances would be handled under the Department's proposal.

Mr. ATWOOD. Since the current law precludes DOD from reimbursing severance paid by DOD contractors that exceeds customary U.S. severance pay even though such payments may be required by host nation labor laws, contractors may cease doing business with DOD. This may force DOD to find alternate ways to obtain services overseas such as hiring U.S. civilian employees. The Department's proposal would eliminate this problem.

Another problem that has been identified is the lack of a definition or standard of what is customary severance pay in the United States for various categories of labor. There is no standard guide of U.S. severance pay for various labor categories. In fact, the Army and the Air Force have indicated that for many labor categories used overseas there are no comparable positions in the United States. In order to correctly advise potential contractors of the maximum amount of severance pay that DOD will allow on its contracts, contracting officers will need access to surveys of U.S. severance pay before solicitations for overseas services are issued. Such information does not currently exist and is not likely to be available in a reasonable timeframe. The Department's proposal would eliminate this problem in those situations where host nation laws require specified severance payments.

Other problems include an adverse effect on relationships with other sovereigns because the current law precludes severance payments that are required by local law; disparity of treatment between foreign national direct hire U.S. Government employees (to whom the law does not apply) and U.S. contractor employees; and potentially a contravention of existing Status of Forces Agreements.

AUTHORIZATION OF PRINTING FOR TECHNICAL DATA

Senator BINGAMAN. Please describe the current procedures used for acquiring, printing, and disseminating technical data.

Mr. ATWOOD. The requirement for the technical data is placed on contract by citing the appropriate specification(s) on the Contract Data Requirement List (CDRL) by the contracting activity.

The printing of the documents is governed by the requirements of Title 44 of the United States Code and the Joint Committee on Printing (JCP) Printing & Binding Regulations which is promulgated in DOD military regulations and specifications. A requirement for a contractor to duplicate less than 5,000 units of only one page, or less than 25,000 units in the aggregate of multiple pages for the Department or agency, will not be considered to be printing.

The dissemination of the documents, depending on the volume, is done by the approved Government Printing Office (GPO) printer. Mailing labels are furnished by the acquiring activity.

Senator BINGAMAN. Please describe the manner in which the process would be different under your proposal, using illustrative examples.

Mr. ATWOOD. Currently, the printing of government material is accomplished by the Government Printing Office (GPO). Under the proposed approach, Technical Orders (TO's) could be printed by either prime contractors or through local purchase. For example, in lieu of prime contractors delivering camera ready TO's which are then sent to the GPO for reproduction, they would deliver the printed TO's directly to the user activity. This would align itself with the availability of support equipment and other logistics infrastructure, thereby, limiting the amount of Interim Contractor Support (ICS) necessary.

Senator BINGAMAN. Which specific statutes does the Department seek to preempt with its proposal?

Mr. ATWOOD. The applicable laws which we seek to change are 44 U.S.C. 501 and 504.

Senator BINGAMAN. Has the Department estimated the amount of savings it would expect to achieve under its proposal?

Mr. ATWOOD. The savings to be derived from our approach depend upon the complexity of the weapons system involved and the frequency of printing needs. Furthermore, the source of the savings would be founded largely in the reduction of ICS needed to support a weapons system due to lack of adequate/accurate TO's.

PILOT PROGRAM FOR MAJOR DEFENSE ACQUISITION PROGRAMS

Senator BINGAMAN. The pilot program would provide broad authority for waiver of statutes. Which statutes do you see as the impediments to acquisition streamlining that you would seek to waive in such a program?

Mr. O'DONNELL. The statutes identified as examples of the types of laws that would be exempt under section 202, also represent the types of laws that we might consider waiving under section 217. Below are additional statutes pertaining to major defense programs:

10 U.S.C. 2632—Testing Requirements for wheeled or tracked armored vehicles.

10 U.S.C. 2365 Competitive Prototype Strategy Requirement for Major Defense Acquisition Programs.

10 U.S.C. 2438—Competitive Alternative Sources for Major Programs.

10 U.S.C. 2366—Survivability and Lethality Testing for Major Systems and Munitions Programs.

10 U.S.C. 2399—Operational Test and Evaluation of Defense Acquisition Programs.

10 U.S.C. 2400—Low-rate Initial Production of New Systems.

10 U.S.C. 2432—Selected Acquisition Reports.

10 U.S.C. 2433—Unit Cost Reports.

10 U.S.C. 2434—Independent Cost Estimates.

10 U.S.C. 2435—Enhanced Program Stability.

Section 117 of P.L. 100-456—Management of Certain Defense Programs.

Additional socio-economic provisions that we would consider waiving:

41 U.S.C. 46-48c—Javits-Wagner-O'Day Act.

10 U.S.C. 4124-4129 requires the purchase of certain products from Federal prisons.

38 U.S.C. 2011-2014—Vietnam Era Veterans'

Readjustment Assistance Act of 1972.

29 U.S.C. 701-796 Rehabilitation Act of 1973.

41 U.S.C. 35-45—Walsh-Healey.

Additional source restrictions that we may consider waiving:

Section 9009 of P.L. 101-165—the so-called Berry amendment—recurring annual provision.

Other source restrictions included in the fiscal year 1990.

Department of Defense Appropriations Act that we would consider waiving if they are included in future laws:

9037 Mortars.

9045 Super Computers.

9051 Anchor and Mooring Chain.

9061 PAN Carbon Fiber.

Senator BINGAMAN. Where would the waiver authority reside: with the Program Manager, Program Executive Officer, Service Acquisition Executive, Under Secretary for Acquisition, or elsewhere?

Mr. ATWOOD. The waiver authority would reside with the Under Secretary for Acquisition.

Senator BINGAMAN. The proposal states that the waiver authority does not extend to laws "intended to assure financial integrity for the conduct of government programs." Please list those laws which, in your view, are "intended to assure financial integrity for the conduct of government programs."

Mr. O'DONNELL. The following are examples of the laws that are designed to assure financial integrity of our programs:

Public Law 97-255—Federal Managers' Financial Integrity Act of 1982.

Inspector General Act of 1982.

Anti-deficiency Act.

Senator BINGAMAN. The proposal would provide waiver authority for up to six major defense acquisition programs. The statutory definition of the term "major defense acquisition program" includes three separate categories: (1) programs estimated to cost more than $200 million in research, development, test, and evaluation costs; (2) programs with a total estimated cost of more than $1 billion; and (3) other programs designated by the Secretary of Defense. Is it your intent that all three categories of programs will be eligible for designation as a pilot program?

Is it your intent to use this authority for established, stable programs? New research and development efforts? Or other types of programs?

Have you identified any candidates for the pilot program? If so, please list the programs. If not, please describe the characteristics of programs that you are seeking to identify.

What mechanism will you establish to evaluate the pilot programs against other programs in order to determine whether that program has been beneficial?

What standards and criteria will you use to evaluate the pilot programs?

In the commercial marketplace, there are many factors which promote efficiency and accountability within the organizations of both the buyer and the seller. The performance of organizations can be measured by well-understood and accepted indicators such as changes in market share, profit and loss trends, and return on investment. Contractual relationships are governed by the Uniform Commercial Code as well as relevant case law. None of these factors is clearly present in government procurements. If the constraints of current laws and regulations were lifted from the management of major systems acquisitions what measures of efficiency would the Department use to replace management by law and regulations?

Mr. ATWOOD. Responses are provided in the following description of the program. The pilot program is a proposal to provide structure for the implementation of the Department of Defense Initiative to test the tailored application of commercial practices in selected defense acquisition programs. The objectives of this initiative are to achieve increased effectiveness and efficiency in the selected programs and to test the concepts for wider applicability. The legislative portion of this initiative is reflected in section 217 of the Defense Management Improvement Act (S. 2440).

I. *Commercial Practices Pilot Program.* Section 217 would allow the Secretary of Defense to designate up to six (6) defense acquisition programs as part of the Commercial Practices Pilot Program. Designated pilot programs will use commercial-style acquisition practices and management techniques to the maximum extent consistent with (a) the nature, priority, risk, stability, and technological maturity of the programs, and (b) the protection of the public interest assurance of proper expenditure of public funds.

No Special Access Programs (SAPs) will be designated as pilot programs.

The Secretary of Defense will consider all proposals for statutory waivers and notify Congress of all approved waivers for each designated pilot program.

II. *Program Criteria.* Sound criteria will be developed and applied in each of the following areas:

Selection of defense acquisition programs for designation as pilot programs that will test the application of commercial-style practices over a reasonable range of program size and complexity.

Selection of statutes and other provisions of law for complete or partial waivers giving due consideration to the costs and burdens on the program and contractor, as well as the purpose of the law as reflected in its legislative history.

Selection and approval of non-statutory waivers and deviations of FAR, DFARS, and other directives giving due consideration to the costs and burdens in the program and contractor in relation to the benefits of the requirement.

Development and implementation for each designated pilot program of an approach for streamlined, yet effective departmental management and oversight tailored to the needs of the program and giving due consideration to the preexisting circumstances and past performance of the contractor operation(s) or plant(s) in which the program will be performed.

Development and implementation of appropriate, streamlined, financial controls and audit standards and practices, while retaining audit and investigative rights that are needed to protect against fraud or abuse and sufficient to support the pricing of any follow-on noncompetitive contracts, including preservation of the role and authority of the DOD Inspector General.

Development and implementation of appropriate contractual provisions for incentives, warranties, and other remedies to ensure that contractors accept risks and provide assurance of meeting governments needs in a manner similar to their relationships with commercial customers.

Establishment of needed stability in DOD planning, programming and budgeting, as well as in the congressional authorization and appropriation processes, to support the commitments to the designated pilot programs.

III. *Pilot Designation Criteria.* The defense acquisition programs designated as pilot programs will be proposed by the Service Acquisition Executives (SAEs), evaluated by the appropriate Defense Acquisition Board (DAB) Committee, and considered by the DAB prior to designation by the Under Secretary of Defense for Acquisition (USD(A)) as pilot programs. Designated pilot programs will vary in size, complexity, and risk; however, it is expected that they will meet most of the following criteria:

Be of substantial size, although they may be below the threshold for a major defense acquisition program. The range will be from as low as $100 million to the lower range of major programs.

Be for requirements that have been validated by the Joint Requirements Oversight Council (JROC), if required, and that have been assigned a priority that reasonably ensure continued service and OSD funding commitment.

Be programs in which the inherent technical risks of development (or the remaining risks if some development has been accomplished) are such that they can be reasonably assumed by a well-managed contractor under a fixed-price arrangement, then restructure the program into measurable development segments that will permit separate fixed-price contracts. Each segment should contain demonstrations that will show measurable exit criteria have been met.

Be programs for which requirements permit reasonably definitive performance specification expressed as thresholds or as ranges within which contractor trade-offs may be made.

Be programs that will use in whole or in some significant way, production processes that also are used for similar commercial work and be susceptible to all or for similar commercial work and be susceptible to all of a significant portion of the production being performed by a contractor operation or plant that is primarily commercial in its sales and business base.

Be programs for which competition in some form can be conducted early in the program and for which other commercial or government programs utilize similar technologies and production processes that can form a basis for analysis of price reasonableness and independent government cost estimating.

IV. *Procedures for Proposing and Approving Statutory Waivers.* Waivers of statutes under the proposed pilot program legislation will be proposed and approved on a program-by-program basis; however, within a designated pilot program, waivers may cover more than one contract when successive contracts are contemplated for subsequent stages of a program. Procedures will include the following:

Under the proposed legislation, any provision of law could be waived within the specified categories. For each waiver the proposal will provide (a) specific identification of the provision, (b) the reason for the waiver, and (c) the expected benefit to the program.

Proposed waivers will be identified as early in the acquisition process as practical, taking into account government acquisition strategy planning, the results of draft requests for proposals, and appropriate discussions conducted with potential offerors prior to request for proposal (RFP) issuance.

Additional waivers may be identified and proposed during the source selection or negotiations process as a result of proposals received or discussions with offerors.

Since preexisting circumstances and internal management systems of offerors may vary, it is possible that all waivers would not apply to all offerors.

Because of the size of the designated pilot programs, it is unlikely that small or small disadvantaged business set-asides will be an issue at the prime contractor level. Small and small disadvantaged business subcontracting will be addressed on a program-by-program basis, utilizing appropriate goals and incentives in a manner that does not cause the termination or restructuring of previous commercial arrangement with proven supplier or subcontractors.

Notification of waivers approved by the Secretary of Defense will be provided to the Committees on Armed Services of the Senate and House of Representatives.

V. *Procedures for Regulatory Waivers.* Nonstatutory waivers or deviations to the FAR, DFARS, or other DOD Directives, as well as service directives and regulations, will be considered on a program-by-program basis for each designated pilot program.

VI. *Government Program Management and Oversight.* Designated pilot programs will be selected and structured to place greater reliance on existing, proven internal contractor management systems and on the contractor's demonstration of technical and physical progress against pre-agreed exit criteria at specified program phase points. Therefore, government program management and contract administration oversight will be streamlined and will be tailored to (a) the needs of the program, (b) the circumstances of the contractor operation(s) or plant(s) in which the program will be performed, and (c) the demonstrated quality of contractor management systems and process controls. In tailoring the approach to government program management oversight, the following will be considered:

Direct reporting by the program manager to the SAE to permit more rapid decisionmaking on waivers, deviations, and unforeseen problems that may arise during the testing of commercial-style practices.

A reduced program office staff appropriate for the program strategy giving due to consideration to such factors as fewer government directed changes, less participation in design and program reviews, and reduced analysis or approval of detailed contractor submittals.

Analysis of the preexisting circumstances and management systems of the contractor operation(s). For commercial contractors that are not already subject to resident contract administration and government-prescribed systems, a very limited contract administration work force should be used and government-prescribed management systems should not be introduced. For others whose government business has already resulted in a significant government presence and whose operations are based on government-prescribed requirements, plant-wide activities may include the designated pilot program, but program-specific contract administration activities should be limited.

The program manager and the commander of the appropriate DCMC activity should develop a tailored oversight plan that emphasizes monitoring progress through thc contractor's own internal management systems and by pre-agreed demonstrations of technical and physical progress by the contractor.

DAB oversight will be limited to review of the designation as a pilot program and, for pilot programs that are major defense acquisition programs, to a single DAB review when the commitment is made to procure, field, and operate the pilot system. This single review would occur at about the same time as the current milestone II for a development program or milestone III for a non-developmental program. DAB review will be streamlined and a comparable review established for SAE-managed programs with progress reported to the DAB.

VII. *Audit and Financial Controls.* For each designated pilot program, the program manager, in consultation with the appropriate officials and agencies of the Department will develop and propose a streamlined program of financial controls and expected audit requirements consistent with the acquisition strategy, the expected contract type, and the expected payment methodology. In developing this streamlined approach, the following will be considered:

Whether the probable contractor sources already have resident DCAA auditors or are regularly audited by the DCAA because of preexisting programs.

The goals of the pilot program to avoid or minimize the introduction of government-prescribed accounting standards or requirements into commercial contractor operations and to rely to the greatest extent practical on generally accepted accounting principles in such operations.

The goal of the pilot program to rely on existing contractor internal controls, internal audit, and existing management control systems, whether or not the contractor for a designated pilot program is already subject to DCAA audit because of other programs.

The potential for reducing audit through the use of alternatives to progress payments to more nearly parallel commercial payment methodologies. Such alternatives could include providing for periodic payments on the basis of demonstrated progress against pre-agreed criteria, as opposed to progress payments based on cost incurred.

The need to understand contractor accounting systems and practices before proposals are submitted and evaluate them for sufficiency to produce reliable cost and pricing proposals and monitor performance.

The need to be able to evaluate adequately through price or cost analysis proposals for changes to contracts, including changes to fixed-price contracts entered into in competition.

The requirements of the pilot program that government audit and investigative rights be sufficient to protect against fraud or abuse.

VIII. *Congressional Authorizations and Appropriations.* Obtaining needed stability in DOD planning, programming and budgeting, as well as the congressional authorization and appropriation processes, will be essential to support the commercial-style strategies of the designated pilot programs. The Department, acting through the military services, USD(A), and the Comptroller, is committed to work within the administration and with the appropriate congressional committees to ensure that the Department's budgeting and outyear planning supports the goals and objectives of the pilot program.

IX. *Measurement of Pilot Program Benefits.* Expected benefits of the pilot program will accrue from greater program stability, reduced costs of government management and oversight, lower cost of commercial practices used by the contractors, and suppliers in defense acquisition programs. Full measurement of benefits will take several years while the systems are developed, fielded, and operated, and will always be to some degree subjective. However, the following is a preliminary list of measurement criteria that will be used:

The degree to which designated pilot programs achieve pre-agreed exit criteria on time and within the projected costs.

The degree to which the defense industrial base is enhanced by participation of commercial contractors, commercial operations and plants of defense contractors, and commercial subcontractors and suppliers in defense acquisition programs.

Documented reductions from the norm in the size of program offices and the number of personnel devoted to contract administration, audit, and other oversight functions of the designated pilot programs.

The degree to which designated pilot programs experience fewer, or at least no more, incidents of fraud, waste or abuse than other programs with more traditional strategies and government oversight.

The degree to which specific waiver of law or regulations tested under the pilot program are determined to be beneficial and are adopted by legislative or regulatory change for all programs.

Finally, but most importantly, the degree to which the systems fielded under the designated pilot programs meet the user's needs in terms of performance, reliability, and maintainability.

#### TIME FRAME FOR IMPLEMENTATION

Senator BINGMAN. The proposal is described as a pilot program, but the legislation would provide permanent authority to waive virtually all laws for up to six programs at any one time. Do you have any time frame in mind for testing the pilot program concept?

Mr. ATWOOD. We would like to establish detailed guidelines for specific programs as soon as possible after the passage of the legislation.

Senator BINGMAN. The proposal states that the purpose of the program is to test the use of "standard commercial, industrial practices." In the commercial marketplace, relationships between buyer and seller are governed by a variety of laws, including the Uniform Commercial Code (UCC) and the very extensive case law that has been developed under the UCC. Is it your plan to incorporate the UCC and its case law into the regulations and contractual provisions that take the place of the Federal statutes? If so, please describe the provisions of the UCC that are candidates for incorporation into your procedures?

Mr. ATWOOD. We have not studied the applicability of the UCC to major defense program acquisitions. The pilot program is intended to change defense acquisition practices by adopting techniques proven in the commercial sector. That does not necessitate incorporation of the UCC; however, to the extent the UCC has useful provisions, we will certainly consider them. We are not convinced that the Contract Disputes Act should be replaced by another remedies mechanism.

Senator BINGMAN. In the commercial marketplace, there are many factors which promote efficiency and accountability within the organization of both the buyer and seller. The performance of organizations can be measured by well-understood and accepted indicators such as changes in market share, profit and loss trends, and return on investment. Contractual relationships are governed by the Uniform Commercial Code (UCC) as well as relevant case law. None of these factors is clearly present in government procurements. If the constraints of current laws and regulations were lifted from the management of major systems acquisitions, what would serve as the functional equivalent of market share, profit and loss trends, and return on investment in terms of promoting efficiency, accountability, and integrity?

Mr. ATWOOD. It is not our intent to waive laws which assure financial integrity in the conduct of government programs. Furthermore, the pilot program is intended to improve and streamline DOD acquisition management. In the defense acquisition transaction, DOD is the buyer. The question refers primarily to factors by the seller to measure efficiency and effectiveness. Capturing market share, for example, is not a concern of the buyer. We would review the program's success in terms of overall efficiency—time to field systems; manpower involved; number of reports required; and ability to achieve baseline cost, schedule, and performance goals and thresholds.

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### QUESTIONS SUBMITTED BY SENATOR ALAN J. DIXON

#### COMPETITION FOR DOD DEPOT MAINTENANCE WORKLOAD

Senator DIXON. Secretary Atwood, your legislative proposal would repeal the provision of current law prohibiting competition between Army and Air Force depots for depot maintenance workload.

Do you believe that the various industrial facilities of the military services should compete against each other for workload?

Mr. ATWOOD. Initially, the core logistics requirements must be accommodated. Once this minimum workload base is assured, the balance of the workload should be available to compete among the various service depots or with industry.

Senator DIXON. What types of functions or workload could be competed across the services?

Mr. ATWOOD. In general, all functions or workload above the core logistics requirement should be available for competition. Certain restrictions may be required because of security concerns or the sensitivity of the workload under consideration.

Senator DIXON. Would all services and all functions be subject to these competitions without restrictions?

Mr. ATWOOD. No. Assurance must be provided that sufficient workload is performed organically to maintain the core logistics requirement.

Senator DIXON. How much could be saved from such competition in your view?

Mr. ATWOOD. The magnitude of the savings would be determined by the amount of competition. Navy experience has been that competition provides savings whether the successful bidder is an organic facility which has streamlined to become more competitive or a private sector entity.

### AUTHORITY FOR ARMY ARSENALS TO SELL ITEMS TO U.S. FIRMS

Senator DIXON. Secretary Atwood, one of the provisions in our legislative package would authorize Army arsenals and other DOD industrial facilities to sell items to U.S. firms under certain conditions.

What types of products would DOD industrial facilities sell to U.S. firms under this proposal?

Mr. ATWOOD. Under this proposal, DOD industrial facilities would be able to sell items or services which they are equipped to manufacture or provide. This would include defense items which they currently manufacture as well as items that they are capable of manufacturing. Current law does not permit services alone to be sold. If enacted, our proposal would.

The number of facilities which may sell outside DOD and the purposes for which sales may be made have been expanded to facilitate use of unique DOD capabilities or make items available which cannot be obtained practically or readily from private sources. The purpose of the particular revisions in the Defense Management Improvement Act is as follows:

Page 59, line 23 and page 60, line 1: Addition of "(or other Army industrial facility)" and "ammunition, munitions or components thereof." The addition of these words will allow the Army to have items manufactured in other government owned, government-operated (GOGO) facilities and government-owned, contractor-operated (GOCO) facilities for sale. Under present law, Pine Bluff Arsenal, McAlister Army Ammunition Plant and Crane Army Ammunition Activity (all GOGOs) cannot contract all sell to systems contractors. While items can be furnished as government furnished material, this is not satisfactory in the systems context. The same is true with the GOCO ammunition plants. Those plants manufacture ammunition metal parts, propellants and explosives and load, assemble and pack munitions. While we allow plant operators to use the plants to fulfill independent contracts, the Army has no authority itself to have an item manufactured for sale for use in a DOD contract when the plant operator declines to enter a sales contract.

Both Pine Bluff, which manufactures phosphorus munitions and chemical material, and McAlister, which loads assembles and packs bombs, have requested legislative relief to allow them to utilize their existing capabilities to sell to DOD systems contractors, which have requested sales of services or material. In both cases, the capabilities they possess are not commercially available under current law.

Page 60, line 9: Addition of "or for purposes of soliciting a contract with" a friendly foreign government. This language addresses the situation where a contractor (usually a GOCO operator) requests to purchase a few items from Army inventories for use in demonstrating a product to a foreign customer in hopes of obtaining a much larger order. Since the items will not be sold or used in a contract with a U.S. Government agency or foreign country (as presently allowed by section 2208(j)), no authority currently exists for selling the samples.

Page 60, lines 10 and 11: Addition of "for use in commercial expendable launch vehicles". The problem this addresses is that some chemicals needed to make rocket propellant are available only from an Army ammunition plant, and the operating contractor of the plant refuses to enter into contracts with parties other than the Army for sale of the chemicals (the chemicals are also military explosives). The Army has no authority to sell military explosives for use in commercial ventures. Although Congress has authorized government support for the commercial space

launch industry by statute, it has not explicitly authorized sales by the Army. Currently, the Army provides these chemicals to the Air Force on an interdepartmental purchase request, which in turn provides them to the commercial space launch operator. The change would allow the Army to sell directly to commercial operators.

Page 60, lines 21 and 22: Addition of "or authorized to be sold." This language is intended to authorize sales of services separately.

Senator DIXON. What safeguards do you have to ensure that DOD industrial facilities are not actually competing with U.S. manufacturing firms?

Mr. ATWOOD. 10 USC 2208(i) at present provides in paragraph (1)(c) that an article may be sold to a person outside the Department of Defense only if "the article is not readily available from a commercial source in the United States." The proposed changes expand the number of facilities which may sell, the purposes for which sales may be made and allow services to be sold, but do not change the condition that the items must not be readily available from a commercial source. This condition is also specified in the implementing DOD Directive. Its observance is the responsibility of the approval authority for the sale. Proposed sales are reviewed by legal and contracting officials for compliance with statutory requirements in the approval process.

CONTRACTING OUT

Senator DIXON. Secretary Atwood, your legislative package repeals the provision of current law which prohibits the Department of Defense from contracting out certain "core logistics functions"—maintenance depots and supply centers, for example. Why do you want to repeal this provision of law?

Mr. ATWOOD. The Department opposed enactment of the legislative provision on core logistics functions. This legislation limits the authority of the Office of the Secretary of Defense to achieve the substantial cost savings that can be effected under the OMB Circular A-76 program and incidentally, to encourage our in-house organizations to do their best and win the competitions.

Senator DIXON. Are there certain of these core logistics functions which you want to contract out?

Mr. ATWOOD. We would like to include all of the core logistics functions in our inventory of commercial activities that are eligible for consideration for cost comparison under the OMB A-76 program.

Senator DIXON. What are they?

Mr. ATWOOD. See above question and answer.

Senator DIXON. Secretary Atwood, your proposal would repeal the provision of current law which prohibits DOD from contracting out firefighting and security-guard functions. Does DOD want to begin contracting out firefighting and security-guard functions now?

Mr. ATWOOD. We would like to include all of the firefighting and security-guard functions in the inventory of commercial activities that are eligible for cost comparison under the OMB A-76 program.

Senator DIXON. At what bases do you believe these functions should be studied for contracting out?

Mr. ATWOOD. Our installation commanders should have the opportunity to include all of the firefighting and security-guard functions in the inventory of commercial activities that are eligible for cost comparison under the OMB A-76 program.

Senator DIXON. Are there certain types of DOD facilities—those which store and handle nuclear weapons, for example—where you believe firefighting and security-guard functions should not be contracted out?

Mr. ATWOOD. Decisions to study a particular function should be made on a case-by-case basis.

[Whereupon, at 11:35 a.m., the subcommittee adjourned.]

# DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1991

MONDAY, APRIL 30, 1990

U.S. SENATE,
SUBCOMMITTEE ON DEFENSE INDUSTRY AND TECHNOLOGY,
COMMITTEE ON ARMED SERVICES,
*Washington, DC.*

## NATIONAL AND CRITICAL TECHNOLOGY PLANS

The subcommittee met, pursuant to notice, at 2:00 p.m., in room SR-222, Russell Senate Office Building, Senator Jeff Bingaman (chairman of the subcommittee) presiding.

Committee member present: Senator Bingaman.

Professional staff members present: William H. Smith.

Minority staff members present: Romie L. Brownlee, deputy staff director for the minority; Jonathan L. Etherton and John E. Mansfield, professional staff members.

Staff assistant present: Melissa Ann Ramsey.

Committee members' assistants present: John Gerhart, assistant to Senator Bingaman; Melvin G. Dubee, assistant to Senator Byrd; Charles G. Pearcy, assistant to Senator Lott.

Senator BINGAMAN. The subcommittee will come to order.

### OPENING STATEMENT OF SENATOR JEFF BINGAMAN, CHAIRMAN

Senator BINGAMAN. We are meeting this afternoon to receive testimony on government and industry strategies to develop technologies that are critical to the Nation's defense and economic competitiveness.

My interest and the subcommittee's involvement in this is, I think, well known. In 1988, the Congress, beginning in this subcommittee, directed the Defense Department to prepare a Critical Technologies Plan that would permit the executive branch, the Congress, and industry to come together around a vision for where we should be headed.

In last year's Defense Authorization Act, we imposed additional guidance on preparing this plan, and we added the requirement that the administration submit a National Critical Technologies Report that would address both national security and economic competitiveness issues.

The National Critical Technologies Report is to be submitted by the Office of Science and Technology Policy, a panel comprised of government, industry, and academia, which will prepare the report, which is due to the Congress by November of this year.



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It is important to maintain the connection between these key technologies that are considered to be most critical for the Nation and those that are particularly critical to us in the national defense area. We hope that this report will help us to have that bridge.

A tremendous interest has been exhibited by government, industry and other nations in our critical technologies planning process since the release of the first Critical Technologies Plan about 14 months ago. The Aerospace Industry's Association has taken a leading role in identifying the aerospace industry's key technologies for the 1990s through the establishment of their National Center for Advanced Technologies. The Center has established a process to coordinate government and industry planning for these key technologies and is well along in formulating detailed roadmaps for several of them.

The AIA is also reaching out to other industry associations in an effort to broaden the industry perspective in identifying and advancing critical technologies. I believe it is vital that industry be a full partner in any planning process, and I am encouraged by the participation they have had to date in the planning efforts. We will, of course, have questions about how extensive that is and how that can be improved.

At the hearing we had on March 28, the subcommittee was informed as to the details of the 1990 Defense Critical Technologies Plan, which had been released 1 week earlier. As I noted at the time, the plan did represent a significant improvement over last year's report. But we were disappointed that this year's plan did not provide more detailed milestones or funding information. Also, it did not designate lead agencies for each technology, as we called for in the legislation that was passed last year.

Unfortunately, the Defense Critical Technologies Plan still remains more of a report than it does a plan.

Dr. Herzfeld, the newly confirmed DDR&E, testified at the March 28 hearing that much work remains to be done to relate the 20 defense critical technologies to a comprehensive Defense Department Technology Investment Strategy.

We understand this work is progressing well and we hope it is available to be reviewed in the near future.

This afternoon's hearing will have two panels. On the first panel is Dr. William Phillips, who is the Associate Director for Industrial Technology in the Office of Science and Technology Policy. Dr. Phillips will testify on the status and plans presently in place for the National Critical Technologies Report that I referred to just a few minutes ago.

Joining Dr. Phillips in the first panel is Dr. Tom Faught, who is the Executive Director of the National Center for Advanced Technology. He will inform the committee on progress being made by this national center on their key technologies for the 1990s project.

After their testimony and some questions, the second panel, comprised of representatives from three military services and from the Defense Advanced Research Projects Agency and the Strategic Defense Initiative Office, will testify. I am hoping the second panel will tell us how their individual organizations are doing in preparing their own top-down technology planning, how these plans

relate to the overall Defense Critical Technologies Plan. We would also like to hear, of course, any comments they might wish to make on the overall plan, on their participation as preparation and how it might be improved.

Because of the large number of witnesses, I am going to request that witnesses try to summarize their statements. Senator Wallop is not able to be here this afternoon, but I am sure he will have an interest in the testimony we receive.

Why don't we go ahead.

Dr. Phillips, would you and Dr. Faught come up to the witness table? We will hear from you in that order. Then I will have some questions for you.

**STATEMENT OF HON. WILLIAM D. PHILLIPS, ASSOCIATE DIRECTOR FOR INDUSTRIAL TECHNOLOGY, OFFICE OF SCIENCE AND TECHNOLOGY POLICY, EXECUTIVE OFFICE OF THE PRESIDENT**

Dr. PHILLIPS. Mr. Chairman, I am pleased to appear before the subcommittee today to give you a status report on establishing the National Critical Technologies Panel. I would also like to explain in some detail the context into which this study of national critical technologies will fit.

There is general agreement today that global competitiveness and national security are tightly interwoven in that our national defense posture depends on our continuing economic viability. We are in an era where international economic competition poses a formidable challenge, and the administration is taking a number of actions to respond to that challenge.

As we view the U.S. capability to conduct scientific research and develop new technologies, we see an annual investment in R&D exceeding that of Japan, West Germany, the United Kingdom and France combined. The United States still has more scientists and engineers in the workforce than any other country. We have also a substantial fraction of the world's best research universities and laboratories.

What, then, are we concerned about? We are concerned primarily that our huge investment in R&D facilities and manpower are not being utilized adequately by U.S. industry to maintain and advance U.S. technological leadership in world markets, particularly in areas of high technology expertise.

In addition to our strengths in research universities, laboratories, and R&D, we also have a culture that accepts and encourages individualism and entrepreneurism. This attitude motivates individuals to start new businesses with the objective of making a success in the commercial world. Many new technologies have been brought to the marketplace through these individualistic efforts. We also have a tradition of successful Federal R&D, not only in defense and space, but in important civilian applications related to agriculture, health, and aeronautics.

On the other hand, there are significant weaknesses in our current situation that keep us from being "all that we can be." Chief among these are the high cost of capital, the emphasis in this country on short-term return on investment, and our continuing Feder-

al deficit. These factors combine to make it difficult to finance the necessary long-term R&D and other investment that leads to new commercial products.

Another weakness that has a major impact on our ability to compete globally is the need to enhance the quality of the U.S. workforce in terms of education, training, and flexibility to adapt to technological change. No matter how well we generate new technologies, our ability to capitalize on them will be determined by the skills and qualifications of the Nation's human resources.

A significant part of our current problems in industrial competitiveness can also be traced to a less than optimum coupling between the R&D and production divisions within the same company. U.S. industry has some difficulty transforming discoveries quickly into high quality products and into processes for designing, manufacturing, marketing and distributing these products.

Other, apparently cultural, barriers to becoming more competitive are: a negative attitude in many U.S. corporations, especially those that have their own R&D capabilities, toward technologies developed elsewhere; a lingering anti-trust attitude that inhibits company-to-company cooperation; a residual attitude of mutual distrust that inhibits government-to-company cooperation and exchange of ideas.

Finally, among these factors, though, I would say that we have many positives to go along with some of these negatives. One, as I have already pointed out, is our entrepreneurism and our innovativeness. One of our main problems, I think, and perhaps one of our principal problems, is that of execution in manufacturing.

I would say, though, in that context, that the Federal Government has a very major role in improving our competitiveness posture, in fostering, encouraging, and participating in the enabling generic technologies.

I would like to pass on now to what are our preliminary plans, although we are further along than preliminary stages, in the Critical Technologies Studies.

As specified by legislation, the National Critical Technologies Panel will consist of 13 members—six from the private sector and seven from government. The Federal members of the panel have been requested from their agencies, and their names should be made public fairly soon. I will chair the panel.

We have contacted the private sector members, but are still waiting for formal acceptances. We have asked four members from industry and two from academia to join the panel. Their individual backgrounds and expertise have been selected so as to cover a broad range of technology sectors. We expect to have our first meeting next month, that is, in June.

The most important part of the study will be defining the criteria for critical technologies. Once the criteria have been determined—and that needs to be done as soon as possible; we have made a good deal of progress on this—it should facilitate the task of selecting the technologies that satisfy these criteria. After the technologies have been selected, data gathering can proceed in order to supply the information specified by the Fiscal Year 1990 Defense Authorization Act.

Since the panel is considered a Federal Advisory Committee, we have prepared the necessary charter, which is now undergoing internal review. We anticipate filing it very shortly with the Government Support Administration (GSA), as required by law. Analytical and production support for the first report will probably be provided by a current Department of Defense contractor, consistent with funding provisions in the 1990 Defense Authorization Act.

The most important function of the panel itself will be to define the criteria for selecting critical technologies. Although legislation allows the panel to choose up to 30 technologies, the first report will probably specify a smaller number because of the workload and time required to gather the background information for each technology.

We intend to complete a report for the President by October of this year, as directed by law.

This completes my prepared statement. However, I would like to reemphasize that I believe investing in new technologies is a necessary, but not sufficient, condition for achieving international industrial competitiveness. As we get further into the study, we will frequently remind ourselves of that fact. I would welcome an opportunity to discuss this subject at greater length with the subcommittee. I believe we must all keep in mind other factors—economic, educational, fiscal, regulatory and cultural—that we must influence at the same time if we are to maintain our current position in world markets, as well as return in the not too distant future to the more dominant position that this Nation has enjoyed for so many years.

Thank you, Mr. Chairman.

[The statement of Dr. Phillips follows:]

PREPARED STATEMENT BY WILLIAM D. PHILLIPS, ASSOCIATE DIRECTOR FOR INDUSTRIAL TECHNOLOGY, OFFICE OF SCIENCE AND TECHNOLOGY POLICY

Mr. Chairman and Members of the Subcommittee: I am pleased to appear before the subcommittee today to give you a status report on establishing the National Critical Technologies Panel. I would also like to explain in some detail the context into which this study of national critical technologies will fit.

There is general agreement today that global competitiveness and national security are tightly interwoven in that our national defense posture depends on our continuing economic vitality. We are in an era when international economic competition poses a formidable challenge, and the administration is taking a number of actions to respond to that challenge. We believe it is essential that we recognize and use the strengths of our economic system more effectively to remain competitive while at the same time refraining from actions that might distort our basic system of free enterprise which is our ultimate strength.

As we view the U.S. capability to conduct scientific research and develop new technologies, we see an annual U.S. investment in R&D exceeding that of Japan, West Germany, the United Kingdom, and France combined. The United States still has more scientists and engineers in the workforce than any other country. We also have a substantial fraction of the world's best research universities and laboratories. What, then, are we concerned about? We are concerned primarily that our huge investments in R&D, facilities, and manpower are not being utilized adequately by U.S. industry to maintain and advance U.S. technological leadership in world markets, particularly in areas of high technology enterprise.

In addition to our strengths in research universities, laboratories, and R&D we also have a culture that accepts and encourages individualism and entrepreneurism. This attitude motivates individuals to start new businesses with the objective of making a success in the commercial world. Many new technologies have been brought to the marketplace through these individualistic efforts. We also have a tra-

dition of successful Federal R&D, not only in defense and space, but in important civilian applications related to agriculture, health, and aeronautics.

On the other hand, there are significant weaknesses in our current situation that keep us from being "all that we can be," to borrow a phrase from the Army recruiters. Chief among these are the high cost of capital, the emphasis in this country on short-term return on investment, and our continuing Federal deficit. These factors combine to make it difficult to finance the necessary long-term R&D that leads to new commercial products. To some extent the Federal laboratories compensate for this problem by supporting some of the basic and applied research, but ultimately the private sector must undertake the product development and marketing that are necessary for successful commercialization.

While many of our Federal laboratories are excellent technical R&D institutions, they lack expertise concerning the commercialization process. Moreover, the weak coupling between those laboratories and industry makes it difficult for Federal R&D results to be converted by the private sector into commercial technologies. There are those who say that if only the very promising research results available today from these laboratories were to be exploited, a myriad of new competitive products could be developed by the private sector. Thus, one of the activities my office is undertaking is to seek ways to improve the transfer of technology from Federal laboratories to private industry.

Another weakness that has a major impact on our ability to compete globally is the need to enhance the quality of the U.S. workforce in terms of education, training, and flexibility to adapt to technological change. No matter how well we generate new technologies, our ability to capitalize on them will be determined by the skills and qualifications of the Nation's human resources.

A significant part of our current problems in industrial competitiveness can also be traced to a less than optimum coupling between the R&D and production divisions within the same company. U.S. industry seems to have difficulty transforming discoveries quickly—and sometimes even at all—into high-quality products and into processes for designing, manufacturing, marketing, and distributing these products.

Other, apparently cultural, barriers to becoming more competitive are:

A negative attitude in many U.S. corporations, especially those that have their own R&D capabilities, toward technologies developed elsewhere.

A lingering antitrust attitude that inhibits company-to-company cooperation.

A residual attitude of mutual distrust that inhibits government-to-company cooperation and exchange of ideas.

This catalog of some of our significant strengths and weaknesses gives some indication of how we can respond to the international economic challenge. Obviously, technology is the basis on which we build our response, but technology alone is not enough for success. I have mentioned all these other factors so that we can view the role of technology, per se, in the proper perspective as we consider our upcoming study of national critical technologies.

I am sure you can appreciate the fact that we are in a very preliminary stage of the national critical technologies study. Since a lot of the details have not been announced or made final, I can only speak very generally at this point.

As specified by legislation, the National Critical Technologies Panel will consist of 13 members: six from the private sector and seven from government. The Federal members of the panel have been requested from their agencies, and their names should be made public fairly soon. I will chair the panel. We have contacted the private sector members but are still waiting for formal acceptances. We have asked four members from industry and two from academia to join the panel. Their individual backgrounds and expertise have been selected so as to cover a broad range of technology sectors. We expect to have our first meeting next month.

The most important part of the study will be defining the criteria for critical technologies. Once the criteria have been determined—and that needs to be done as soon as possible—it should facilitate the task of selecting the technologies that satisfy the criteria. After the technologies have been selected, data gathering can proceed in order to supply the information specified by the Fiscal Year 1990 Defense Authorization Act.

Since the panel is considered a Federal Advisory Committee, we have prepared the necessary charter which is now undergoing internal review. We anticipate filing it very shortly with the General Services Administration as required by law. Analytical and production support for the first report will probably be provided by a current Department of Defense contractor consistent with funding provisions in the 1990 Defense Authorization Act.

The most important functions of the panel itself will be to define the criteria for selecting critical technologies. Although legislation allows the panel to choose up to

30 technologies, the first report will probably specify a smaller number because of the workload and time required to gather the background data for each technology. We intend to complete a report for the President by October of this year as directed by law.

This completes my prepared statement. However, I would like to reemphasize that I believe investing in new technologies is a necessary but not a sufficient condition for achieving international industrial competitiveness. As we get further into the study we will frequently remind ourselves of that fact, and I would welcome any opportunity to discuss this subject at greater length with this subcommittee. I believe we must all keep in mind other factors—economic, educational, and cultural—that we must change at the same time if we are to maintain our current position in world markets as well as return, in the not too distant future, to the more dominant position that this Nation has enjoyed for so many years.

Senator BINGAMAN. Thank you very much, Dr. Phillips.

Before I ask you any questions, let me call on Tom Faught to go ahead with his testimony.

## STATEMENT OF THOMAS F. FAUGHT, JR., EXECUTIVE DIRECTOR, THE NATIONAL CENTER FOR ADVANCED TECHNOLOGIES

Dr. FAUGHT. Thank you, Mr. Chairman. I have prepared some brief remarks for you and the regular statement is on the sideboard.

I am Tom Faught, Executive Director of the National Center for Advanced Technologies, otherwise known as NCAT. I would like to commend the members of the subcommittee for their strong support of efforts to strengthen the Nation's technology base, as well as its industrial base.

Public Law 101–189, the Defense Authorization Act of 1990–1991, should accomplish much to ensure our national competitiveness in the future markets.

I appreciate also the opportunity to address this subcommittee today on a subject of such national importance as the Defense Critical Technologies Program. I am particularly honored to be on the first of these two panels today with Dr. William Phillips. He certainly is going to play a pivotal role in the strengthening of America's technology base.

In your letter of April 11, Mr. Chairman, you requested three things. One is that we provide you a brief description of NCAT's strategy for establishing and coordinating a national cooperative effort to assure U.S. technological leadership.

Second is that we describe how NCAT's activities and the key technologies program particularly support the Defense Department's Critical Technologies Plan.

Last is that we comment on the DOD's Critical Technologies planning effort, including potential areas where an NCAT might assist in strengthening future defense critical technologies plans.

Inasmuch as NCAT is fairly new, I think it might be useful to preface my response to these points with a brief comment concerning the foundation. In other words, "where we are" and "where we are going."

The foundation's principal thrust, hence my principal area of responsibility as Executive Director, is to develop a national consensus regarding the vital importance of 10 selected technologies which industry considers key to its future global competitiveness and to the Nation's military preparedness. Although considerable work remains to be done, I believe that we are well on our way to

achieving this objective and implementing the "Key Technologies for the Year 2000" Program.

NCAT's overriding strategy in achieving national consensus regarding these key technologies is "top down/bottom up" participation by senior government, industry, and academic executives and officials. We are accomplishing this participation through our technical development teams, our aerospace Technology Policy Forum, our national strategic technology symposia, and through frequent, comprehensive briefings to congressional, administration, industry and university decisionmakers and implementers.

Additionally, as you requested, in an effort to provide greater central national focus on these key technologies, we are looking to work cooperatively and much more closely with other industry organizations, such as the Suppliers of Advanced Composite Materials Association; government groups, such as the National Institute of Standards and Technology and the Defense Advanced Research Projects Agency; and independent organizations, such as the Industrial Research Institute.

Our key technologies Roadmaps spell out the "whys" that justify the importance of the specific innovation involved, as well as the "whats" in terms of definition and scope. The technology development plans which fall from these roadmaps provide comprehensive compendia regarding how the technology is to be developed, who should be responsible for developing the technology and following through with its implementation, what resources are required, and where potential hurdles exist, as well as an examination of those obstacles.

The plans are promulgated to a national audience through strategic symposia. Our first symposium, on rocket propulsion, was held in February of this year. Our second, which deals with advanced composites, is planned for late this year.

Next spring, probably in March or April, we intend to have a major national symposium concerning all of the key technologies.

Possibly the most unique aspect of our effort, particularly in view of our goal to achieve consensus, is the Technology Policy Forum, a body currently composed of 25 senior government officials, university leaders and seasoned industry executives. Collectively, these people offer a very broad scope and diversity of backgrounds, which are essential to providing NCAT oversight and counsel and to building the consensus we seek.

Let me now turn to the Defense Critical Technologies Program.

Approximately three-fourths of the twenty 1990 Defense Critical Technologies are covered by our Key Technologies. Additionally, DOD organizations are already participating actively in the teams used in developing our Key Technologies effort.

Obviously, therefore, there are a number of areas in which industry and DOD can work together to produce a comprehensive, more useful, plan. We have reviewed our approach and discussed increasing cooperative efforts with Deputy Secretary of Defense Donald Atwood and Dr. Charles Herzfeld, DOD's new Director of Defense Research and Engineering, as well as with their key executives.

As one approach, we in NCAT would welcome even greater DOD participation in our effort toward development of a truly joint government-industry product.

Early next year, we will be able to provide DOD with Key Technology development plans for 14 critical technologies of their 1990 defense report. If they so choose, DOD is welcome to use these data in the preparation of its 1991 Critical Technologies Plan, and this has already been discussed with them.

It is of significance to point out that our development plan data will cover all eight of DOD's Group A priority technologies, the so-called Pervasive Technologies. We will cover four of DOD's seven Group B technologies, and two of its five Group C subjects.

Roadmaps are already available for most of these critical technologies. However, I should emphasize at this point that our Roadmaps and our Technology Development Plans will require some "fleshing out" and some modification to meet DOD's weapon systems scope and rationale.

We certainly are prepared to assist DOD concerning the remaining six critical technology plans by lending our support, analysis methods, format and so forth, to industry associations and to others in developing appropriate roadmaps and development plans for these other areas.

We believe that such increased industry participation, which also folds in strong university participation, would enable DOD to present the Congress with a broad-based industry/government/academia product for its information and deliberations.

Turning to our comments now about DOD's 1990 Critical Technologies planning effort, I first would congratulate the Defense Department on the significant improvement achieved over its initial 1989 report. The scope and integrity of the most recent product represents a major step forward, as you have already stated.

As to areas wherein NCAT could assist in further strengthening future Defense Critical Technologies Plans, I would say that we have to look at the DOD plans in relation to our own experience with our own key technologies efforts. We have found that strengthening is required in the following areas in our planning as well as theirs.

One is the *basic overall strategy;* that is, a comprehensive overview or review of "why" a given technology is "critical" or "key."

Second is *an integration approach.* This is needed to establish both technologically developed timing as well as resource priorities.

Third is *accountability and participation.* "Who" or "what" department is going to be responsible or accountable for the plan, as well as the implementation, and "what" are they supposed to do?

Fourth is the *nature and sources of the resources involved;* manpower and facilities as well as funding.

Last is to *identify and clearly assess the hurdles* being faced, in some cases basic technology yet to be developed.

In summary, an effective plan must have an overriding strategy. Chosen areas of innovation must have specific goals. Third, there must be a management control process against which technological and funding progress can be well measured. Fourth, participants' roles and accountability must be well defined and understood.

Philosophically, I look at the technology planning process in the same way one looks at a corporation's strategic business plan. The Congress, in effect, is the Board of Directors, and the Secretary of Defense, in the case of the Defense Critical Technologies Plan, is

the Chief Executive Officer. He is presenting a strategic technological plan to the board, a plan in this case so vital it concerns the future security of our Nation. The plan and the requirement's strategy, development goals and resource needs which comprise it, is provided for the board's reference, understanding, and, in a sense, Mr. Chairman, its approval. Once this is achieved, the CEO has the job of carrying it out and keeping the board apprised of progress, and, if required, possible modifications.

In all of our scientific and technical planning efforts, I would emphasize our concern regarding one particularly important point, and that is scientific and technical education. NCAT and the aerospace industry are painfully aware of the already acute and increasing shortage of adequately trained American scientists, engineers, and science and mathematics teachers. While not a key technology per se, our planning effort addresses this vital need, as well as specific technologies.

Mr. Chairman, this concludes my remarks. It has been a pleasure being here and I am prepared to address any questions you may have.

[The statement of Mr. Faught follows:]

## TESTIMONY OF THOMAS F. FAUGHT, JR.

## EXECUTIVE DIRECTOR
## THE NATIONAL CENTER FOR ADVANCED TECHNOLOGIES

Thank you, Mr. Chairman. I am Tom Faught, Executive Director of the National Center for Advanced Technologies. I would like to commend the members of the subcommittee for their expressions of concern and strong support of efforts to strengthen the nation's technology base and its industrial base. Along with other initiatives being considered, Public Law 101-189, The Defense Authorization Act of 1990-1991 -- as its impact matures -- should accomplish much toward restoring our country's technological leadership.

I am most appreciative of the opportunity to address this subcommittee today on a subject of such national importance as the Defense Critical Technology program. I am honored to share the first of this afternoon's panels with Dr. William Phillips, who -- as OSTP's Associate Director for Industrial Technology -- will play a pivotal role in strengthening America's Technology Base.

Last June, Mr. Noel Longuemare, a senior Westinghouse Corporation executive representing the Aerospace Industries Association, introduced this subcommittee to The Key Technologies for the Year 2000 program and to the recently formed foundation, The National Center for Advanced Technologies. As Mr. Longuemare pointed out, these two industry initiatives are aimed at ensuring American aerospace technological preeminence, with regard to both industrial competitiveness and national security, as we prepare for the global orientation of the 21st Century.

In your letter of April 11, Mr. Chairman, you requested:

(1) That we provide you a brief description of NCAT's strategy

for establishing and coordinating a national cooperative effort to assure U.S. technological leadership;

(2) That we describe how NCAT's activities and the Key Technologies program support the Defense Department's Critical Technologies Plan, and

(3) That we comment on the DoD Critical Technologies planning effort, including potential areas wherein NCAT might assist in strengthening future Critical Technologies Plans.

I think it might be profitable to preface my response to those points with a brief update on NCAT, where are are and where we're going.

NCAT's principal thrust, hence my principal area of responsibility as Executive Director, is development of a national consensus regarding the vital importance of 10 selected technologies that industry considers key to its future global competitiveness and to the nation's military preparedness. Although considerable work remains to be done, I believe that we are well on our way toward attainment of this objective.

NCAT's overriding strategy in achieving national consensus regarding the 10 select Key Technologies is "top down, bottom up" in-depth participation by government, industry and the academic community. We are accomplishing this participation - this direct, continuous involvement - through our technology development teams, our Aerospace Technology Policy Forum, our national strategic technology symposia, and through frequent, comprehensive briefings to Congressional, Administration, industry and university decision-makers and implementers. We plan to continue this emphasis through periodic roadmap and technology development plan reviews and updates extending well into the next century.

Additionally, in an effort to provide greater central national focus on selected technologies, we are looking to work cooperatively with such other associations as the Suppliers of Advanced Composite Materials Association, government groups such as the National Institute of Standards and Technology and the Defense Advanced Research Projects Agency, and independent organizations such as the Industrial Research Institute.

If "there is nothing so certain as death and taxes," there is nothing so uncertain as ensured success in basic and applied research. I should underline the fact that the scope of our effort is the Technology Base, or, in jargon of the Pentagon, 6.1, 6.2 and some 6.3A R&D categories.

However, as Mr. Longuemare so wisely pointed out in his testimony last year, validation and integration demonstration programs are an integral part of technology implementation. Agreement on which approaches should have the highest priorities is essential to a successful, cost-effective technology development strategy.

Our roadmaps spell out the "whys" that justify the importance of the specific innovation and the "what" in terms of definition and scope. The Technology Development Plans that follow from the roadmaps provide comprehensive compendia regarding "how" the technology is to be developed, "who" should be responsible for development implementation, "what" resources are required - and "where" potential hurdles exist.

If we expect practical proposals to result, such planning demands considerable time and effort. Our technology teams, numbering hundreds of government, industry and academic experts, have been working on these roadmaps and plans for the past several years. The plans are promulgated to a national audience through strategic symposia. Our first symposium, on rocket propulsion, was held in February of this year. Our second, which

deals with advanced composites, is planned for the fall of 1990. Next spring, we intend to have a major national symposium concerning all of the Key Technologies.

I don't think it is at all presumptuous to characterize the Key Technologies program and The National Center for Advanced Technologies as unique initiatives. Possibly the most unique aspect, particularly in view of our goal to achieve consensus, is the Technology Policy Forum, a body currently composed of 25 senior government officials, university leaders and seasoned industry executives. Collectively, these people offer the very broad scope and diversity of background that is essential to providing NCAT oversight and counsel, and to building the consensus we seek. As you are aware, Mr. Chairman, invitations to these quarterly deliberations are extended to appropriate senior Congressional leaders in both the House and Senate, as well as to the Director of the Office of Technology Assessment.

Let me turn now to the Defense Critical Technologies Program. In the interest of proper perspective, it is important to remember that the March 15, 1990 submission was but the second such report in response to the request by Congress. I believe DoD is to be commended on its achievement.

Having been in DoD during the preparation of the 1989 report, I can attest to the "time crunch" experienced in producing that first report. There was little time to focus on Defense-wide and Department of Energy-wide critical technology issues, not to mention obtaining industry's perspective. However, the Office of the Secretary of Defense approached industry last fall and three industry groups -- Aerospace Industries Association, the National Security Industries Association and the Electronic Industries Association -- reviewed the DoD's first year effort.

Approximately three-fourths of the 1990 Defense Critical

Technologies are covered by our Key Technologies. Additionally, DoD organizations are participating in our Key Technologies efforts to develop national plans.

Obviously, therefore, there are a number of areas in which industry and DoD can work together to produce a comprehensive, more useful plan. We have reviewed our approach and discussed increasing cooperative efforts with Deputy Secretary of Defense Donald J. Atwood, Jr. Last week, I discussed with Dr. Charles M. Herzfeld, DoD's new Director of Defense Research and Engineering, ways in which NCAT could assist his organization in developing future Critical Technologies Plans. Richard H. Hartke, AIA's Director of Technology Programs, has on-going discussions with Dr. Herzfeld's staff on this same subject. Thus, closure has been made, and I believe we can work more closely together with DoD to develop a plan for the future. As one approach, we in NCAT would welcome DoD's increased participation in our effort toward development of a truly joint government/industry product.

Early in 1991, we will be able to provide technology development plans, on which the DoD 1991 Critical Technologies report could be based, for the following DoD technologies: *

- o Advanced Composites (Composite Materials)
- o Advanced Sensors (Passive Sensors, Sensitive Radars, Data Fusion)
- o Air Breathing Propulsion (Air Breathing Propulsion)
- o Optical Information Processing (Photonics)
- o Artificial Intelligence (Machine Intelligence and Robotics)
- o Computational Science (Signal Processing, Parallel Computer Architecture, Computational Fluid Dynamics)

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* Key Technologies and DoD Critical Technologies are defined differently; DoD technologies are shown in parentheses.

** o Rocket Propulsion (High Energy Density Materials)

o Software Development (Software Producibility)

o Ultra Reliable Electronic Systems (Semiconductor Materials and Microelectronic Circuits)

o Superconductivity (Superconductivity)

Roadmaps already are available for most of these Key Technologies. However, the roadmaps probably would require additional "fleshing out" in terms of weapon systems rationale and scope.

NCAT could encourage and assist other industry associations by providing planning support for the remaining six DoD Critical Technologies, viz., Simulation and Modeling, Signature Control, Weapon Systems Environment, Pulsed Power, Hypervelocity Projectiles and Biotechnology Materials and Processes.

NCAT and the Key Technologies for the Year 2000 program are well positioned to support future DoD Critical Technologies efforts by bringing to the DoD plan an industry perspective buttressed by clear university and government-wide inputs. Since NCAT is an impartial body, we can help develop an objective, nationwide consensus for what otherwise might be considered strictly military-oriented efforts.

In comparison with the 1989 effort, DoD has achieved substantial improvement in its 1990 Defense Critical Technologies program. However,

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** Several elements of the Key Technologies Rocket Propulsion Development Plan, including High Energy Density Materials, are applicable to DoD's Critical Technologies Program.

looking to NCAT needs for further strengthening of its own Key Technologies plans, it occurs to me that the areas in which we are striving for improvement may also be fruitful ground for improvements applicable to the future Defense Critical Technologies planning process.

We offer for DoD's consideration these areas in which our roadmaps and technology development plans require strengthening:

- o Strategy and Goals - The technology selected as key or critical - its definition, scope and priority evolved from a requirement; a broad but relatively well defined need, i.e., the "why" part of our equation. Why should there be agreement that a certain technology is "key"? An effective strategy will enable us to reference such considerations as "affordability," "leverage opportunities" and so forth. This is the principal factor we shall be refining in future Key Technology reviews.

- o Accountability - Who or which organization is best positioned to successfully implement the development plan? Inasmuch as our Key Technologies are generic, not unlike the Critical Technologies, we have assigned the development task to specific companies even though the given technology cuts across several enterprises and departments.

- o Integration - Resources, including technology innovations, are not adequate or sufficiently developed to permit all 10 Key Technologies to be developed at the same speed or magnitude. Thus, a form of "critical path" analysis is

needed to establish priorities, and consequently to make better use of resources, including funding. Technology integration demonstration should also be addressed.

- o Technology Definition - Are we focusing on technology applications or basic core technologies? Program elements, even for core technologies, are required for inter-technology integration and for establishment of priorities.

- o Funding Sources - Funding sources relate to potential return on investment or benefits to be derived. For example, the benefits to industry of technology investments in rocket propulsion and advanced composites Key Technologies differ considerably.

- o Roles of Participants - There is need to define the relative roles and scope of activities among industry, government and academia -- and, in select instances, the international community -- in development work regarding certain Key Technologies, e.g., Advanced Sensors.

- o Assessment of Obstacles - Each of the Key Technologies faces obstacles in its development path, not the least of which could be termed "risk-reward amortization." Such challenges require identification and evaluation in order to determine whether the program makes sense and what priority it deserves.

- o Comprehensiveness - Test and evaluation, and manufacturing or

processing technologies, frequently are as important as the core technologies in our Key Technologies effort. Such needs must be adequately related to the eventual systems or application requirement.

In all of our scientific and technical planning efforts, I would emphasize our concern regarding an area which, without substantial and near term improvement, will restrict any Key Technologies or Critical Technologies thrust. That area is scientific and technical education. NCAT and the aerospace industry are painfully aware of the already acute and increasing shortage of adequately-trained scientists, engineers and science/mathematics teachers. While not a key technology, per se, our efforts address this vital need. Our Rocket Propulsion technology initiative, for example, should result in the first new textbook on rocket propulsion in 30 years. NCAT's industry supporters are reaching even further to instill among our nation's youth greater interest in the sciences. An example is the updating and rewriting of the Merit Badge Series on space, electronics and computers for the Boy Scouts of America. Prudence dictates that, early on, this totally volunteer effort be extended to similar references being used by the Girl Scouts.

In summary, an effective plan (1) must have an overriding strategy; (2) chosen areas of innovation must have specific goals which present technology does not meet; (3) there must be a management control process against which technological and funding progress can be measured; and (4) participants' roles and accountability must be well defined and understood.

Our experience indicates that the Key Technologies approach provides a sound model for developing a national technology strategy. We

look forward to continuing the effort and broadening it to include the interests of other industries.

Mr. Chairman, this concludes my remarks. Once again, it is a pleasure to be here, and I shall be happy to respond to any questions you and other committee members may have.

Senator BINGAMAN. Thank you very much.

Dr. Phillips, let me ask you a few questions first.

As you know, we visited before on this set of issues. But I think the involvement of the Office of Science and Technology Policy and yourself and Dr. Bromley is crucial to making this a national effort and to trying to ensure coordination and cooperation between the defense sector and the nondefense agencies and industry in general.

I guess my real question, which we discussed a little bit before, is once we get this report done—and, as you know, we have directed that we try to do one of these every 2 years, this year's report being the first of I believe six that we have specified in the statute from now through the year 2000—what do you see us doing with the report?

In what way do you think the report will be useful in decisions at the Federal level or otherwise?

Dr. PHILLIPS. Well, Senator Bingaman, I think it will be useful in the sense that there have been a number of studies done on the critical emerging technologies, and I think if we do our job properly, we will be able to pull together these various studies with a consensus set of critical technologies, "consensus" meaning top echelons of the Federal Government and industry, leaning very heavily on all of the studies that have been done.

Therefore, what we should have is a consensus list of critical technologies with proper reasons why they were chosen, with the background on what our position is vis-a-vis other countries, and with what needs to be done in order to implement them.

All right, what can be done with them as far as their implementation?

As you know, Dr. Bromley, working with the heads of the departments and agencies of the Federal Government, has made a good deal of progress in rejuvinating the FCCSET Committees—the Federal Coordinating Committees for Science, Engineering and Technology—which have as a major responsibility determining crosscutting priorities and will have a great deal of clout in determining budgets and programs, both with respect to the missions of the various agencies and departments, and then, even more importantly, in the cross-cutting issues, which these critical technologies will almost undoubtedly fall under. That is to say, I seriously doubt that any one of the critical technologies that we, or the other studies identify, will be supported solely by any single agency or department. Therefore, the FCCSET Committees will have the re-

sponsibility of considering the priorities for such technologies as they consider budgets and programs for the various agencies.

In addition, the President's Council of Advisors for Science and Technology will provide additional input on what should be done in the areas of these critical technologies.

Now this is just a start. To be very frank with you, we are very seriously considering the proposal of yourself and your office with respect to the Critical Technologies Institute. We have some other ideas that we want to come back to you with, shortly, on other ways to accomplish this task. We share with you the importance of formulating strategies, implementing the strategies, and then monitoring progress. But, we are simply unsure, beyond what I have already mentioned, in terms of FCCSET and PCAST, precisely what we, at least, think is the proper way to go on them.

Senator BINGAMAN. From your comments, I gather that you do agree that, once the report is done, then there has to be adequate resources to monitor progress in actually pursuing, developing, and nurturing the areas of technology development that have been identified.

Dr. PHILLIPS. Yes, sir.

Senator BINGAMAN. That's what you're doing, struggling to come up with the best way to do that, as I understand it.

Dr. PHILLIPS. Yes, sir.

Senator BINGAMAN. We're talking about capability which is a high-level scientific and technological competence here. We're not talking about ministerial types of functions. We're talking about people who really can make some subjective judgments about what makes sense and what does not, and give competent advice in these areas.

Dr. PHILLIPS. We very much believe, Senator, that it does take a high level of competence. We also very much believe that, in any of these critical technologies, it is very important that the user, whether these be the defense industry, the Defense Department, or whether it be private industry, have very major input in formulating what these technologies are and, in participating in an active way in determining the strategies for carrying them out.

Again, we do not believe that, unless industry is interested, in committing its own resources to these critical technologies that one has much of a chance of carrying any general recommendations to fruition.

Senator BINGAMAN. I think one of the other things we have been trying to get to, and I know many others have, as well, and the Aerospace Industry Association certainly has, in identifying these and setting them out in a clear fashion is maintaining a continuity of effort to develop them over a long enough period of time.

I was struck by the article in the New York Times this morning on Japan's interest in pursuing massively parallel processing. I notice that is one of the 20 critical technologies identified by the Department of Defense in this year's report.

I gather that is one clear example, where a sustained effort, both supported by the Federal Government and industry over a long period of time, is going to be required if we are going to maintain the lead that we clearly have in that area at this time.

Is that your view of that particular subject area?

Dr. PHILLIPS. It certainly is, sir. As you know, we do have a lead in the area of parallel processing now, and a lot of this has occurred because DARPA financing of companies like Thinking Machines in Cambridge and Intel in California. Certainly, the announcement of a Japanese program is something that we cannot take lightly. They go into these things seriously and we have to be serious. Yes, sir.

Senator BINGAMAN. Let me ask Mr. Faught if you would just give me your thoughts as to the extent to which industry has been able to participate so far in the two reports that the Department of Defense has put out.

I agree with you that the ideal circumstance is to get to where we have as many of these priority-setting efforts as possible coordinated and integrated into one, so that we don't have one government list of priorities and another for industry.

To what extent has your organization or members of your organization been able to have input into what the Defense Department has done so far?

Dr. FAUGHT. Mr. Chairman, I would like to just put this into perspective.

I happened to be in the DOD organization last year when this plan was first requested. I recall the "time crunch" we had between January and March to get something of value on paper. So the 1989 effort was a bit of a scramble.

But, having said that, I will certainly give DOD, and particularly George Millburn and his troops, full marks for the 1989 effort. After the smoke had cleared, they didn't have too much time to even develop a Defense-wide approach, much less extend the review to industry. However, in spite of the pressure, they did come to three of our associations, including ourselves, and ask us to provide an overview and somewhat of an audit of the results of that study.

Now that they have had that under their belt, this last approach, for 1990, we in industry had several inputs, principally in terms of the approach taken. Already we are starting to talk about how we can work together more effectively for 1991.

I think there is a maturing on the part of both parties, industry and government, as to what we jointly can contribute. We have offered a couple of approaches. One I mentioned in my remarks, and that is to increase the interest DOD already has in our technology development teams, as well as increased participation by NASA, Energy, and others.

The other is to accept, if they will, for the 1991 effort a review of data we have already developed, and enlarge on that or change the rationale and scope to agree with their weapons systems responsibilities.

Now, in each of our development plans, we will have funding projections, as well as our best estimate as to where that funding should originate. I think the cheese may get a little binding, frankly, if we just test things of that nature. But, nevertheless, I think more will be gained from frank discussion in those areas and then we work out whatever we can and they work out whatever they can for their product than not discussing it at all.

For example, one of the technologies we find critical in the aerospace business is rocket propulsion. The Rocket Propulsion Study consists of 16 different what one might call "program elements," and some 400 different programs, with a small "p." We feel that some of those, and I think they agree that some of those elements—not in totality, but some of the elements—would be applicable to their plans.

But one of the things we have to do is agree on some definition. When I mentioned that our 10 technologies, as they are defined, cover 14 of the present 20, there is obviously some redefinition of terms required. That would be the first approach.

But I would think in the overall that, given the first short out of the chute, so to speak, the 1989 plan was not really a plan, as you suggest. I think the 1990 plan comes much closer to being a plan. I think that there is a cooperative environment there that we can capitalize on.

I'm pretty jaded, and I still think that. [Laughter.]

Senator BINGAMAN. Let me ask both of you to comment on this. Here is an issue that I think is worth exploring a little bit.

We have the effort by the Office of Science and Technology Policy to identify National Critical Technologies. We have the industry effort that you are heading to identify those that are of particular importance to the aerospace industry, but also to some other industries. I am not sure exactly, but do you see your focus as being those that particularly relate to your industry and you're looking for ways to broaden that? Is that the status of it at this time?

Dr. FAUGHT. Not necessarily. For example, our second symposium—and I don't mean to emphasize that that is the second most important item or that rocket propulsion is the first—but our second one encompasses advanced composites.

Now, the applications for advanced composites are far broader than aerospace, even as broad as that is.

For example, in our technology development teams, we were even going out to find experts in processes that are very interested in composites, as well as the automotive industry and others.

The five areas, almost generic areas, if you will, of composites that we are covering, cover a much broader application than the aerospace industry. Of equal importance, I might add, is that the manufacturing technology, also somewhat of a matrix, cuts across many industries regarding composites. It also relates to funding. Where in aerospace the probability is to progress along those technological lines would require a proportionately larger government funding than industry; on the other hand, in composites, we are looking for almost a reversal of those roles, perhaps even moreso than a reversal.

So, in many of the industries, superconductivity, ultra reliable electronic systems, composites, et cetera, they are going to be far broader than merely aerospace. That is why, subject to your suggestion, we are having discussions now with other industry associations, to more or less plumb the depths, if you will, of their interest to join with us.

Senator BINGAMAN. Okay.

What I was really going to ask is this, and either of you could comment. Dr. Phillips, perhaps you could comment on this first.

There is a group, a private sector group, called the Council on Competitiveness, with which you are undoubtedly familiar. They have, of course, been very interested in this set of issues. They have a project that Bobby Inman is heading, which is entitled a "Strategic Assessment of National Technology Priorities in U.S. Competitiveness."

I have a short description of it here. They indicate that they have three fundamental objectives to identify on a sector by sector basis, the critical technologies: strategic U.S. industrial priorities in science and technology; second, to determine the impediments to technology development in these sectors; and, third, to use the information to develop a broader national strategy to guide public policy related to science and technology.

They have picked out nine particular industrial sectors, one of which is aerospace. Also, electronics components, equipment, semiconductors are one; aerospace is one; telecommunications is one; computers and software is another. They are sectors which are technology intensive. They are intending, as I understand it, through this effort, to come up with their analysis of what the technologies are most related to those areas, or what technology priorities ought to be pursued in order to advance the competitive posture of each of those sectors.

I would be interested in any comments that either of you have as to how that kind of effort, or the analysis that is going to be done there, will relate to these more generic national technologies that the Office of Science and Policy is taking the lead on developing a list of, and perhaps also the Aerospace Industry Association.

Are either of you familiar with Bobby Inman's project here?

Dr. FAUGHT. Yes.

Dr. PHILLIPS. Yes.

Senator BINGAMAN. How do you see this effort to get into each of these nine industrial sectors and come up with lists relating to what you are trying to do?

Dr. PHILLIPS. Well, Mr. Chairman, as Dr. Faught indicated in his study, in the National Critical Technologies Study we planned and are scheduling the Competitiveness Council, as well as the AIA and other groups, to brief our panel. We want as much input as possible as we can from other studies and from professional groups.

Now, as I indicated in my comments, one of the most difficult tasks is selecting criteria on which you choose these critical technologies. Our feeling is that the input from the Inman Study and all the other studies is going to be crucial in what we will come up with because we are going to be identifying technologies that could be classified as enabling, generic of technologies, for which we can then plan further on how to implement.

I would just say that the Council on Competitiveness Study which is underway is going to be very important to us in arriving at a consensus. All of the various studies are going at this effort in slightly different ways. I believe, however, that all will share common elements.

They are all very important. But it seems to me that the more of the studies that you see, the more that a consensus is building up

on what the critical ones are. It is very important that we have the criteria, the reasons for catagorizing them, and then what the strategy might be for implementing important ones.

Senator BINGAMAN. Mr. Faught, did you have any comment on this?

Dr. FAUGHT. Yes.

I think Bobby Inman's effort brings up a little bit of a conundrum, which is a major challenge between the Council on Competitiveness and Bill's organization, and that is how they go about establishing priorities, and, ergo, how they go about integrating these programs.

As I understand it, the Council is looking at these nine industries somewhat separately. In other words, establishing priorities in aerospace somewhat akin to what we are doing. But when you get finished, as far as the National Technology Effort is concerned, I think the group on National Critical Technologies is going to have to go beyond that, which they had already planned to do, and make a total integration. In other words, if you are comparing aerospace and some of our key technologies with the biochemical field, someone is going to have to determine, from a national standpoint, for funding and education and the development of all these resources, which is the number one, which is the first of all these various industries that requires attention.

It is particularly important in those areas where there is not a near-term industry motivation or industry trade-off. I think that is going to be a challenge, which Bill's organization is facing.

In fact, when they went through their process with us the other day at our forum, Ron York pointed out that number one is going to be very vital in establishing why, what really justifies the 30, and within the 30, what really justified the top priorities, which is going to be a mammoth job.

Senator BINGAMAN. Let me ask on one other line of questioning here.

In the language we put in for the Defense Department's Critical Technologies Plan and also the language related to the National Critical Technologies Report, we lumped together product and process technologies, and indicated we would like to know what the top 20 or top 30 are from the combined product and process.

There are some who have suggested that that doesn't make sense; that really it would be better to treat the two separately.

I would be interested in any perspective that either of you has on whether we should do it as we have, whether we should continue down the road we have, of integrating them, or whether we should have a clear differentiation and perhaps require a separate report on process technologies, so that they are not shoved to the back, or given short shrift, or otherwise neglected.

Dr. PHILLIPS. Well, my own view is that we should proceed with more or less integrating the product and process technologies together. I think it has been one of our problems here in this country, that we have tended to feel one is more important than the other; and, frankly, process technologies have often been left out of our thinking.

So, I don't feel that a separate report is needed; but I think that they should be considered on their own merit. A process can be

equally important with a product, or a phenomenon. My own view is that this is the proper approach.

Senator BINGAMAN. Mr. Faught, did you have a comment on that?

Dr. FAUGHT. I tend to agree with that, too.

I think, however, that in certain areas of technology, there may be some possibility of grouping them. But, for example, in composites, there are so many unique technologies relating to manufacturing and processing that really directing the composite technology will have very little relevance, relatively speaking, to others; whereas in some of the MANTECH operations, notably in the automotive industry or in the metalworking industry, where quality and consistent performance is equally important as cost reduction, perhaps there are some ways there that a MANTECH application could be broader than, say, one given technology.

But I think, until that is proven, we had better advance the technology and the manufacturing process together.

Senator BINGAMAN. Mr. Faught, your suggestion in your comments is that it would be good if we could consolidate the efforts going on in industry and in the Department of Defense.

When we put the language in the Fiscal Year 1989 Defense Authorization Act related to the Department of Defense, we did not mandate an establishment of a formal mechanism or entity which requires industry participation, like we did in the case of OSTP's National Report, where they have 6 of the 13 members to be private sector members—not all from industry, necessarily, but, presumably, many from industry.

Would we be well advised to rethink the language that we have for DOD so that there is a formal requirement that DOD pull in industry and try to consolidate what industry is doing already with what they are doing in the way of planning?

Dr. FAUGHT. I think that is an interesting approach. But let me just perhaps think aloud with you for a moment.

The one thing that occurs in the Department of Defense, which may make language useful, is that there is a tremendous churning of people, far moreso in any given program or any given area of technology than in industry.

Perhaps some type of required council might lend itself to a stronger continuity of effort. However, having said that, I would like to see what the results are in the next edition or two editions, if you will, of the plan before incorporating more language. It seems to me that language rather begets language, and if you have to look at the language to make up for the cooperative spirit, sometimes we all come up the loser.

I think Herzfeld is new. He just got on first base, more or less, and I think we ought to give him and Betti and some others a little time to see what kind of product and what kind of systems they are interested in obtaining. I would think that perhaps the next 18 months would be the proof of the pudding.

Senator BINGAMAN. All right. This testimony is very useful.

We appreciate the efforts both of you are making in this area, and we may undoubtedly have some other questions. As we go forward, we will continue to stay in touch to see if we can be helpful to what you are working on.

Why don't we go on now to our second panel.

The second panel is made up of five individuals. Let me go through the list of people. I would ask them to come up and be seated.

They are: Brig. Gen. Stephen Condon, who is the Director of Program Planning and Integration in the Office of the Assistant Secretary of the Air Force for Acquisition; Dr. Philip A. Selwyn, who is the Director of the Office of Naval Technology in the Department of the Navy; Mr. George T. Singley III, who is Deputy for Research and Technology in the Office of the Assistant Secretary of the Army; Dr. Victor H. Reis, who is Deputy Director of DARPA; and Dr. Dwight P. Duston, who is the Director of the Innovative Science and Technology Office of SDIO.

We appreciate all of you being here.

I think that maybe a logical way to proceed is just to start on the right.

Mr. Singley, would you want to start? We will just go right down the line here and then I will have questions for each of you.

**STATEMENT OF GEORGE T. SINGLEY III, DEPUTY FOR RESEARCH AND TECHNOLOGY, OFFICE OF THE ASSISTANT SECRETARY OF THE ARMY FOR RESEARCH, DEVELOPMENT AND ACQUISITION**

Mr. SINGLEY. Gladly.

Good afternoon, Mr. Chairman. I appreciate this opportunity to present to you a brief description of how the Army has integrated the DOD Critical Technologies Plan into our Army Technology Base Master Plan.

The President's fiscal year 1991 budget protects Army research and technology holding the greatest promise for long-term warfighting capabilities. This is necessary if we are to preserve our technological options for the future and to avoid technological surprise in this increasingly uncertain world.

As force structure is reduced, fewer quantities of weapon systems are procured, fewer new systems enter full scale development, and development programs delayed or stretched, we must protect the technology base.

While protecting basic and applied research, we should maintain a robust, advanced technology development program so that promising competing technologies and concepts may be demonstrated and evaluated.

This approach provides insurance against unforeseen shifts in the threat.

Last year, the Army published its first Army Technology Base Master Plan, an unclassified copy of which I deliver to you, sir. This was endorsed by the Army Science Board and approved by the Secretary of the Army and the Chief of Staff of the Army.

This plan has been issued to the Government, industry, and academia to convey our vision, our objectives, our priorities, and corresponding investment strategy.

We insisted that this document be resource constrained, so that it may serve as Department of the Army guidance to drive funding priorities and the technology base program as a whole. It focuses

and harnesses our laboratories and our research, development, and engineering centers.

The first Army Technology Base Master Plan presented 13 key emerging technologies which were deemed to hold the most promise for benefiting the Army of the future. In order to keep our master plan current, and in the interest of continually improving it, the Army asked the National Academy of Sciences to review the master plan, the key emerging technologies, and advanced concepts which hold the most promise for the Army of the future.

This 2 year study, called the "Strategic Technology for the Army of the Future," or the STAR study, is scheduled to be completed by next summer. Our Technology Base Master Plan shows a close linkage between the DOD critical technologies plan, the preparation of which we participated in extensively, and our key emerging technologies.

I would add that, in addition to the National Academy of Sciences reviewing our current master plan, we are also conducting rather extensive technology base war gaming. In fact, we are in our second set of Technology Base war games series, to look at promising advanced concepts and to demonstrate what the real operational impact is of our critical technologies.

The Army has committed approximately one-third of our $1.25 billion in the fiscal year 1991 budget to pursue DOD critical technologies. Guided by the science and technology objectives that we have put in our Army Technology Base Master Plan, we can track critical technology progress. Many of these critical technologies are being demonstrated in the technology base war gaming that I mentioned earlier, our advanced technology transition demos, our advanced simulation, as well as our prototyping efforts.

We have also prepared technology development plans for each of our Advanced Technology Transition Demonstrations (ATTDs). These technology development plans in essence baseline our technology demonstrations and lay out critical milestones, exit criteria, and cost constraints for the accomplishment of the specific objectives within those technology demonstrations.

I would like to share with you some examples of our critical technology programs to give you an insight into how the critical technologies will impact our future systems, as we see it.

The Army has been a leader in the development and application of composite materials for use in not just secondary structures, but also for primary load-bearing structures as well. Under the Advanced Composite Airframe Program we conducted during the 1980s, we demonstrated the first airframe constructed out of entirely advanced composite materials. We are now currently using a Bradley Fighting Vehicle as a baseline to demonstrate the first all-composite ground combat vehicle.

One of the issues that is very important in this area is manufacturing technology, which was referenced by the previous panel. I would like to say that the Army pushed very vigorously for an expansion of the discussion on manufacturing technology in this year's Critical Technologies Plan because we think it is a very important enabling technology.

The Army has significantly increased its support and investment in electric guns and hypervelocity projectiles. One critical technolo-

gy playing a major role in making this revolutionary weapon a practical weapon system is pulsed power. Along with the Defense Nuclear Agency, Strategic Defense Initiative Office and the Navy, we are pursuing a 10-fold improvement in capacitor performance. Advancements in power supply, pulse forming network, and switching technology are needed if electric guns are to be practical weapon systems.

Several critical technologies are being demonstrated in the Army's Rotorcraft Pilot's Associate Program. The machine intelligence, data fusion, advanced signal processing and advanced sensors are all essential to achieving an automated target recognition capability. Such a capability will significantly enhance lethality, survivability, crew effectiveness, and, therefore, flight safety by reducing air crew cognitive overload.

Advanced simulation technology is also a key component of the Rotorcraft Pilot's Associate Program. We are investigating the networking of crew station research facilities with SIMNET. This would allow us to evaluate competing technologies in the simulator and to perform tradeoffs prior to building the actual cockpit.

This will not only reduce development time, improve systems integration and enhance crew/machine interface, it will also greatly assist the user in performing informed tradeoffs, so that a better requirement may be written prior to entering costly development.

Several of the DOD critical technologies are prerequisites to smart weapons and the air/land battle management needed by the Army of the 21st century.

Sir, you asked in your preliminary request, that we address ways to improve the DOD Critical Technologies Plan. So I would like to just take a couple of minutes to discuss that.

The DOD Technology Base Master Plan is something that we would like to propose. In other words, take the DOD Science and Technology Investment Strategy and the DOD Critical Technologies Plan and, much as we have done within the Army, put that into a comprehensive DOD Technology Base Master Plan. Such a plan would contain the strategy for supporting basic and applied research, advancing the DOD Critical Technologies, supporting a robust advanced technology demonstration program so that we may properly evaluate and down-select among competing technologies, and advanced concepts in a timely manner.

This plan would serve as a capstone document providing DOD top/down guidance to the services, and releasing such a plan to industry and academia would also favorably influence their investment plans.

It is essential that such a plan be resource-constrained. We have learned that within the Army. This is so you do not just have a nice document that reads well but does not have any impact. It should be realistic in terms of being resource constrained.

Finally, progress by the services could very well be measured in part by a comparison against this master plan as part of the annual OSD reviews.

Mr. Chairman, in these remarks I have outlined the considerable progress made by the DOD and the Army in the past 2 years toward focusing our technology base efforts. The DOD Critical

Technologies Plan is a key ingredient in our investment strategy and is supported by the Army.

It is important to remember, however, that our Technology Base Investment Strategy must be more than a list of critical technologies. We must, in the final analysis, ensure that we deliver the right technology in time for development of the right weapon system for the Army of the future.

With the high degree of uncertainty relative to global events, it is imperative that we protect the DOD technology base, focus it and harness it. Today's soldiers have benefited from past commitments to a robust technology base and tomorrow's soldier deserves no less.

Sir, this concludes my prepared remarks. I will be glad to take any questions.

[The statement of Mr. Singley follows:]

STATEMENT BY

MR. GEORGE T. SINGLEY III

DEPUTY FOR RESEARCH AND TECHNOLOGY

OFFICE OF THE ASSISTANT SECRETARY OF THE ARMY FOR

RESEARCH, DEVELOPMENT AND ACQUISITION

GOOD AFTERNOON MR. CHAIRMAN AND MEMBERS OF THE COMMITTEE. I APPRECIATE THIS OPPORTUNITY TO PRESENT TO YOU TODAY A BRIEF DESCRIPTION OF HOW THE ARMY HAS INTEGRATED THE DOD CRITICAL TECHNOLOGIES PLAN INTO OUR ARMY TECHNOLOGY BASE MASTER PLAN.

THE FISCAL YEAR 1991 PRESIDENT'S BUDGET PROTECTS ARMY RESEARCH AND TECHNOLOGY PROGRAMS HOLDING THE GREATEST PROMISE FOR LONG-TERM WARFIGHTING CAPABILITIES. THIS IS NECESSARY IF WE ARE TO PRESERVE OUR TECHNOLOGICAL OPTIONS FOR THE FUTURE AND TO AVOID TECHNOLOGICAL SURPRISE IN THIS INCREASINGLY UNCERTAIN WORLD. AS FORCE STRUCTURE IS REDUCED, FEWER QUANTITIES OF WEAPON SYSTEMS ARE PROCURED, FEWER NEW SYSTEMS ENTER FULL SCALE DEVELOPMENT, AND DEVELOPMENT PROGRAMS DELAYED OR STRETCHED, WE MUST PROTECT THE TECHNOLOGY BASE. WHILE PROTECTING BASIC AND APPLIED RESEARCH, WE SHOULD MAINTAIN A ROBUST ADVANCED TECHNOLOGY DEVELOPMENT PROGRAM SO THAT PROMISING COMPETING TECHNOLOGIES AND CONCEPTS MAY BE DEMONSTRATED AND EVALUATED. THIS APPROACH PROVIDES INSURANCE AGAINST UNFORSEEN SHIFTS IN THE THREAT.

LAST YEAR THE ARMY PUBLISHED ITS FIRST ARMY TECHNOLOGY BASE MASTER PLAN ENDORSED BY THE ARMY SCIENCE BOARD AND APPROVED BY THE SECRETARY OF THE ARMY AND THE CHIEF OF STAFF OF THE ARMY. THIS PLAN HAS BEEN ISSUED TO GOVERNMENT, INDUSTRY AND ACADEMIA TO CONVEY OUR VISION, OBJECTIVES, PRIORITIES AND CORRESPONDING INVESTMENT STRATEGY. WE

INSISTED THAT THIS DOCUMENT BE RESOURCE CONSTRAINED SO THAT IT MAY SERVE AS DEPARTMENT OF ARMY GUIDANCE TO DRIVE FUNDING PRIORITIES AND THE TECHNOLOGY BASE PROGRAM AS A WHOLE. IT FOCUSES AND HARNESSES OUR LABORATORIES AND RESEARCH, DEVELOPMENT AND ENGINEERING CENTERS.

THE FIRST ARMY TECHNOLOGY BASE MASTER PLAN PRESENTED L3 KEY EMERGING TECHNOLOGIES WHICH WERE DEEMED TO HOLD THE MOST PROMISE FOR BENEFITING THE ARMY OF THE FUTURE. IN ORDER TO KEEP OUR MASTER PLAN CURRENT AND IN THE INTEREST OF CONTINUALLY IMPROVING IT, THE ARMY ASKED THE NATIONAL ACADEMY OF SCIENCES TO REVIEW THE MASTER PLAN, THE KEY EMERGING TECHNOLOGIES, AND ADVANCED CONCEPTS WHICH HOLD THE MOST PROMISE FOR THE ARMY OF THE FUTURE. THIS TWO-YEAR STUDY, CALLED THE STRATEGIC TECHNOLOGY FOR THE ARMY OF THE FUTURE (THE STAR STUDY) IS SCHEDULED TO BE COMPLETED BY NEXT SUMMER. OUR TECHNOLOGY BASE MASTER PLAN SHOWS A CLOSE LINKAGE BETWEEN THE DOD CRITICAL TECHNOLOGIES PLAN AND OUR KEY EMERGING TECHNOLOGIES.

THE ARMY HAS COMMITTED APPROXIMATELY ONE-THIRD OF OUR $1.25B TECHNOLOGY BASE FUNDS PURSUING THE DOD CRITICAL TECHNOLOGIES. GUIDED BY THE SCIENCE AND TECHNOLOGY OBJECTIVES CONTAINED IN THE ARMY TECHNOLOGY BASE MASTER PLAN, WE TRACK CRITICAL TECHNOLOGY PROGRESS. MANY OF THESE CRITICAL TECHNOLOGIES ARE BEING DEMONSTRATED IN ADVANCED TECHNOLOGY TRANSITION DEMONSTRATIONS WHICH ARE BASELINED BY INDIVIDUAL TECHNOLOGY DEVELOPMENT PLANS CONTAINING SPECIFIC MILESTONES AND EXIT CRITERIA SO THAT WE MAY MEASURE PROGRESS.

I WOULD LIKE TO SHARE WITH YOU SOME EXAMPLES OF CRITICAL TECHNOLOGY PROGRAMS VERY IMPORTANT TO THE ARMY'S FUTURE.

THE ARMY HAS BEEN A LEADER IN THE DEVELOPMENT AND APPLICATION OF COMPOSITE MATERIALS FOR USE IN NOT JUST

SECONDARY, BUT PRIMARY STRUCTURES AS WELL. UNDER THE ADVANCED COMPOSITE AIRFRAME PROGRAM, THE ARMY DEMONSTRATED THE FIRST AIRFRAME CONSTRUCTED FROM ADVANCED COMPOSITE MATERIALS WITH DRAMATIC WEIGHT AND COST SAVINGS AS WELL AS SIGNIFICANT INCREASE IN SURVIVABILITY AND SAFETY. WE ARE CURRENTLY CONDUCTING A DEMONSTRATION OF A COMPOSITE HULL USING THE BRADLEY FIGHTING VEHICLE AS A BASELINE.

THE ARMY HAS SIGNIFICANTLY INCREASED ITS SUPPORT AND INVESTMENT IN ELECTRIC GUNS AND HYPERVELOCITY PROJECTILES. ONE CRITICAL TECHNOLOGY PLAYING A MAJOR ROLE IN MAKING THIS REVOLUTIONARY WEAPON A PRACTICAL WEAPON SYSTEM IS PULSED POWER. ALONG WITH THE DEFENSE NUCLEAR AGENCY, STRATEGIC DEFENSE INITIATIVE OFFICE AND THE NAVY, WE ARE PURSUING A TEN-FOLD IMPROVEMENT IN CAPACITOR PERFORMANCE. ADVANCEMENTS IN POWER SUPPLY, PULSE FORMING NETWORK AND SWITCHING TECHNOLOGY ARE NEEDED IF ELECTRIC GUNS ARE TO BE PRACTICAL WEAPON SYSTEMS.

SEVERAL CRITICAL TECHNOLOGIES ARE BEING DEMONSTRATED IN THE ARMY'S ROTORCRAFT PILOT'S ASSOCIATE PROGRAM. MACHINE INTELLIGENCE, DATA FUSION, ADVANCED SIGNAL PROCESSING AND ADVANCED SENSORS ARE ESSENTIAL TO ACHIEVING AN AUTOMATED TARGET RECOGNITION CAPABILITY. SUCH A CAPABILITY WILL SIGNIFICANTLY INCREASE LETHALITY, SURVIVABILITY AND CREW EFFECTIVENESS AND, THEREFORE, FLIGHT SAFETY BY REDUCING THE AIRCREW COGNITIVE OVERLOAD.

ADVANCED SIMULATION TECHNOLOGY IS ALSO A KEY COMPONENT OF THE ROTORCRAFT PILOT'S ASSOCIATE PROGRAM. WE ARE INVESTIGATING THE NETWORKING OF CREW STATION RESEARCH FACILITIES WITH SIMNET. THIS WOULD ALLOW US TO EVALUATE COMPETING TECHNOLOGIES IN THE SIMULATOR AND TO PERFORM TRADEOFFS PRIOR TO BUILDING THE ACTUAL COCKPIT. THIS WILL

NOT ONLY REDUCE DEVELOPMENT TIME, IMPROVE SYSTEMS INTEGRATION AND ENHANCE CREW/MACHINE INTERFACE, IT WILL ALSO GREATLY ASSIST THE USER IN PERFORMING INFORMED TRADEOFFS SO THAT A BETTER REQUIREMENT MAY BE WRITTEN BEFORE WE ENTER A DEVELOPMENT DECISION.

SEVERAL OF THE DOD CRITICAL TECHNOLOGIES ARE ALSO PREREQUISITES TO THE SMART WEAPONS AND AIRLAND BATTLE MANAGEMENT NEEDED BY THE ARMY OF THE 21ST CENTURY.

IN RESPONSE TO YOUR REQUEST FOR WAYS TO IMPROVE THE DOD CRITICAL TECHNOLOGIES PLAN, I WOULD RECOMMEND THAT THE DOD CRITICAL TECHNOLOGIES AND THE DOD SCIENCE AND TECHNOLOGY INVESTMENT STATEGY SHOULD BE INTEGRATED INTO A DOD TECHNOLOGY BASE MASTER PLAN SIMILAR TO THE ARMY'S TECHNOLOGY BASE MASTER PLAN.

THE DOD TECHNOLOGY BASE MASTER PLAN SHOULD CONTAIN OUR STRATEGY FOR SUPPORTING BASIC AND APPLIED RESEARCH, ADVANCING THE DOD CRITICAL TECHNOLOGIES, AND SUPPORTING A ROBUST ADVANCED TECHNOLOGY DEMONSTRATION PROGRAM SO THAT WE MAY PROPERLY EVALUATE AND DOWNSELECT AMONG COMPETING TECHNOLOGIES AND ADVANCED CONCEPTS IN A TIMELY MANNER.

THIS PLAN SHOULD SERVE AS A CAPSTONE DOCUMENT, PROVIDING DOD TOP-DOWN DEFENSE GUIDANCE TO THE SERVICES AND DOD TECHNOLOGY BASE AGENCIES. RELEASING SUCH A DOD PLAN TO INDUSTRY AND ACADEMIA WILL ALSO FAVORABLY INFLUENCE THEIR INVESTMENT PLANS.

IT IS ESSENTIAL THAT SUCH A PLAN BE RESOURCE CONSTRAINED IN ORDER FOR IT TO BE USEFUL GUIDANCE AS OPPOSED TO SIMPLY BEING ANOTHER ADVOCACY DOCUMENT WHICH DOES NOT FIT BUDGET REALITIES.

FINALLY, PROGRESS BY THE SERVICES SHOULD BE MEASURED IN PART BY A COMPARISON AGAINST THIS MASTER PLAN, DURING THE

ANNUAL OSD REVIEWS.

MR. CHAIRMAN, IN THESE REMARKS I HAVE OUTLINED THE CONSIDERABLE PROGRESS THE ARMY HAS MADE IN THE PAST TWO YEARS TOWARD FOCUSING THE ARMY'S TECHNOLOGY BASE COMMUNITY. THE DOD CRITICAL TECHNOLOGIES PLAN IS A KEY INGREDIENT IN OUR INVESTMENT STRATEGY AND IS SUPPORTED BY THE ARMY. IT IS IMPORTANT TO REMEMBER, HOWEVER, THAT OUR TECHNOLOGY BASE INVESTMENT STRATEGY MUST BE MORE THAN A LIST OF CRITICAL TECHNOLOGIES. THE ARMY'S STRATEGIC PLANNING INITIATIVE GOES BEYOND THAT.

WE MUST, IN THE FINAL ANALYSIS, ENSURE THAT WE DELIVER THE RIGHT TECHNOLOGY IN TIME FOR DEVELOPMENT OF THE RIGHT WEAPON SYSTEM THAT THE ARMY OF THE FUTURE NEEDS. WITH THE HIGH DEGREE OF UNCERTAINTY RELATIVE TO GLOBAL EVENTS, IT IS IMPERATIVE THAT WE PROTECT THE DOD TECHNOLOGY BASE, FOCUS IT AND HARNESS IT.

TODAY'S SOLDIERS BENEFIT FROM PAST COMMITMENTS TO A ROBUST TECHNOLOGY BASE. TOMORROW'S SOLDIER DESERVES NO LESS.

Senator BINGAMAN. Thank you very much.
Dr. Selwyn, why don't you go next.

## STATEMENT OF PHILIP A. SELWYN, DIRECTOR, OFFICE OF NAVAL TECHNOLOGY, DEPARTMENT OF NAVY

Dr. SELWYN. Thank you, Mr. Chairman.

My name is Philip Selwyn, and I am the Director of the Office of Naval Technology.

I am particularly pleased to have the opportunity to address you this afternoon on the subject of critical technologies and management of the Navy's technology base activities.

The Navy's investment strategy for its technology base is derived from a national security strategy that mandates continued fulfillment of U.S. responsibilities in both Europe and Asia. In addition, the changing world environment will increase our responsibilities with respect to Third World nations. Successful implementation of U.S. strategy has required that our forces maintain technical superiority in their weaponry and platforms and, with the proliferation of high-technology weapons on the world arms market, we see no lessening of this requirement.

The Navy's technology base activities play a crucial role in maintaining that technological leadership. The Navy's technology base

program is designed to develop new technology, both for future generation systems and for upgrades to systems in development, which will meet naval needs for the next 15 to 25 years.

The Navy's technology investment strategy, particularly in the 6.2 arena, for which I am personally responsible, is developed in a distinctly top-down manner. At the highest level, the program responds to the broad goals and objectives of the DOD Science and Technology Investment Strategy. In addition, the Chief of Naval Operations provides guidance which conveys both the technology needs for each area of naval warfare and the relative priorities across these warfare areas. For example, antisubmarine warfare remains the Navy's number-one priority. However, radioelectronic battle management and low intensity conflict are areas of increasing importance.

The next step is the strategic planning of the technology program, which is conducted annually as part of the overall Navy budget and program development process. Each year my office establishes and formally documents an investment strategy for each warfare mission area in terms of the potential for operational impact of the planned technology program on the warfighting capabilities of the Navy and the Marine Corps, and we adjust resources as needed to reflect changing priorities across and within warfare mission areas.

The investment strategy provides guidance, priorities, and resource allocations for each technology area and forms the basis for exploratory development technology programs at Navy laboratories and R&D centers, at universities, and in industry.

The process examines the new opportunities emanating from basic research; assesses technical progress within our own program; and looks carefully at Army, Air Force, DARPA, and SDIO accomplishments and plans, as well as the investment of industry in their Independent Research and Development, or IR&D, program.

The Congress sees the results of this in-depth planning process in the form of the Navy's fourteen 6.2 program elements, which were restructured in fiscal year 1987 to align with the Navy's warfare mission areas. It is important to note that this program-element restructuring was undertaken in direct response to the 1986 Senate Armed Services Committee direction to develop a vehicle for Congress to provide broad oversight to the relative weight of R&D efforts across mission areas and among promising technologies.

One of the essential elements in the Navy's approach to management of technology is the recognition that achievement of mission-oriented technology objectives normally requires the orchestrated exploration, development, and maturation of a diverse collection of individual technologies. Pursued separately, these same technologies would generally evolve at their own different rates, focus on different research issues, or maybe not be developed at all, because their criticality might be obscured in the absence of central mission-oriented goals and an integrated approach to management.

The Navy, therefore, believes that the key to success in the military high-technology arena is to couple the foundational technologies, highlighted in the DOD Critical Technologies Plan, with service-managed technology programs supporting specific mission areas and needs.

To illustrate the general point raised above, I will discuss the Navy's highest priority 6.2 program, the Office of Naval Technology's High Gain Initiative, or HGI. The objective of the High Gain Initiative is to determine the physical and technological limits of passive acoustic submarine detection by fixed, undersea surveillance arrays. The underlying driver for this program is the rapidly quieting Soviet submarine threat. The answers to the questions being pursued in HGI will profoundly affect the entire posture of the United States in terms of how it will conduct ASW operations in the post-2000 era.

From the Navy point of view, satisfying the objectives of HGI is a critical goal. Therefore, all technologies necessary to achieving that goal are viewed by the Navy as essential technologies. Moreover, development of those technologies must proceed in a focused, integrated manner, if definitive answers are to be achieved in a timely fashion.

To achieve HGI goals, we project that bottom-deployed volumetric arrays, many kilometers on a side, consisting of large numbers of hydrophones, will be needed. But to fully exploit the detection power of such an array, detailed knowledge of the ocean, accurate knowledge of the location of each hydrophone, and advanced signal processing algorithms will all have to be brought to bear. Breaking the task down one level further, we understand there are at least 11 technologies that are absolutely critical to achieving HGI's objectives. I have included a list of those technologies in my formal statement.

All of these 11 technologies are being explored, applied, developed, matured and demonstrated within HGI's integrated program of sea tests, theoretical and data analysis, simulation, and hardware/software development. Some, but not all of these, are DOD critical technologies. HGI is leading the technological "charge" in most of these areas—for both the DOD-identified and Navy-identified technologies. In some technologies, HGI is taking advantage of developments elsewhere, such as the DARPA supercomputer development programs.

Upon completion of the comprehensive HGI program, the risk associated with decisions regarding full-scale development will be markedly reduced compared to a situation where some critical technologies might have been developed aggressively, while other essential technologies might have been totally ignored—a situation that can be anticipated if undue emphasis is placed on a few discreet technologies. The key is balance in the DOD Science and Technology program, a broad generic technology base that gains maturity through focused, integrated, mission-oriented technology programs, like the HGI.

A comparison of Navy technology needs with the DOD critical technologies list reveals many similarities. Perhaps this should not be too surprising, since the Navy was an active player in the development of the DOD Critical Technologies Plan. Navy participation included both the policy level and the working group. The Navy was instrumental in adding the weapon system environment to the 1990 list due to the heavy influence the ocean environment has on acoustic ASW. Of course, there are other technologies that the Navy supports, such as underwater propulsion and active sonar,

which are equally essential but tend to be Navy-unique in character.

In summary, the Navy is extremely sensitive to the crucial role of technology and has protected its technology investments even in a declining budget environment. The Navy fully supports the DOD Critical Technologies Plan and is presently investing approximately one-third of its science and technology resources in those technologies. The Navy also supports other technologies deemed essential to the future mission of the Navy and the Marine Corps. However, the Navy continues to hold to the management philosophy that stresses focusing on achieving a mission-capability vice focusing on discrete technologies. Accordingly, we believe one improvement for next year's planning process would be to incorporate the DOD Critical Technologies Plan within the DOD Science and Technology Investment Strategy so that a more explicit linkage between these technologies and mission-capability goals would be established. Such a framework would provide the services with management tools to guide the development of technology within the appropriate DOD context.

Thank you, Mr. Chairman. That concludes my remarks.

[The statement of Dr. Selwyn follows:]

STATEMENT OF

DR. PHILIP A. SELWYN

DIRECTOR, OFFICE OF NAVAL TECHNOLOGY

Good afternoon Mr. Chairman and distinguished members. My name is Philip Selwyn and I am the Director of the Office of Naval Technology. I am particularly pleased to have the opportunity to address you this afternoon on the subject of critical technologies and management of the Navy's technology base activities.

The Navy's investment strategy for its technology base activities is derived from a national security strategy that mandates continued fulfillment of U.S. responsibilities in both Europe and Asia. In addition, the changing world environment will increase our responsibilities with respect to Third World Nations. Successful implementation of our strategy presumes that our naval forces will maintain technical superiority in their weaponry and platforms. As such, our warfighting strategy is achievable only if our nation maintains its current technological leadership. The Soviet Union's quantitative advantages and qualitative advances in space, submarine warfare, cruise missiles, and electronic warfare are tangible evidence that our ability to maintain a technological edge clearly is being challenged. Proliferation of high technology will continue to expand on the world arms market and will become prevalent in the Third World. Therefore, the requirement to maintain technological superiority remains absolutely essential.

The Navy's technology base activities play a crucial role in maintaining that leadership and the recent Navy re-organization in response to the DMR recognized this central role by providing management guidance for execution of programs funded in the 6.1, 6.2 and 6.3A RDTE,N categories under the Chief of Naval Research, reporting directly to the Assistant Secretary of the Navy (Research, Development and Acquisition) as the Navy's Science and Technology Executive.

The Navy's technology base program is designed to develop new technology both for future-generation systems and for $P^3I$ to upgrade current systems which will allow the U.S. Navy to meet the projected threats for the next 15-25 years. At the top level, the program responds to the broad goals and objectives of the DOD Science and Technology Investment Strategy. The DOD long-term goals are derived from the National Defense Strategy which stresses three elements: deterrence, military superiority, and affordability. Two elements of this strategy, deterrence and military superiority, have long been cornerstones of the Defense strategy. Affordability is receiving increased emphasis in view of projected constraints on manpower and funding.

Navy tech base policy is amplified by Science and Technology Guidance which is issued by the Chief of Naval Operations. Navy Science and Technology Guidance is a composite of warfare area needs which provides operational requirements to the technology base. It states that ASW remains the Navy's number one priority. However, radio electronic battle management and Low Intensity Conflict are areas of increasing importance. The historical preference to utilize naval forces for crisis control and the projected high probability of occurrence of such situations is expected to severely stress future naval forces.

The Chief of Naval Research's overall goal is to provide the Navy and Marine Corps with new and improved fleet operational capabilities in the most cost-effective and timely manner possible. This goal will be achieved by developing technology to:

- keep ahead of the projected threat
- provide affordable system options
- reduce fleet operating costs
- avoid technological surprise.

To achieve these goals, the Navy's Science and Technology Program draws upon Department of the Navy (DON) and industrial expertise and the best science emerging from basic research to address current and projected fleet and expeditionary force problems and needs. It emphasizes those areas which offer the greatest potential payoff and are most consistent with DON and Department of Defense (DOD) warfare requirements.

So how do we plan each year to reach our goals. As part of the overall Navy annual budget and program development process, my office establishes an investment strategy for each warfare mission area in terms of the potential for operational impact of the planned technology program on the warfighting capabilities of the Navy and Marine Corps. The investment strategy provides guidance, priorities, and resource allocations for each technology area, and forms the basis for exploratory development technology programs at Navy laboratories and centers or, where appropriate, contractual technology development programs with U.S. industry. This planning process responds to the 1986 SASC direction to develop a vehicle for Congress to provide broad oversight to the relative weight of R&D efforts across mission areas and among promising technologies.

An integral part of this process is to draw upon the national basic research base, including the Navy's mission-oriented basic research program. A constant objective is to take advantage of emerging scientific breakthroughs and guard against technological surprise. An example is the recent opportunity offered by the potential of high-temperature superconductivity. In this instance, an existing cadre of experts in the fields of materials and superconductivity were rapidly assembled from associated on-going tasks and re-vectored to the task of planning and programming naval technological implementation of superconductivity from development to fleet application.

One of the essential elements in the Navy's approach to the management of technology is the recognition that achievement of mission-oriented technology objectives normally requires the orchestrated exploration, development, and maturation of a diverse collection of individual technologies. Pursued separately, those same technologies would generally evolve at their own different rates, focus on different research issues, or maybe not be developed at all, because their criticality might be obscured in the absence of central mission-oriented goals and an integrated approach to management. The Navy therefore believes that the key to success in the military high-technology arena is to couple the foundational technologies highlighted in the DOD Critical Technologies Plan with Service-managed technology programs supporting specific mission areas and needs.

To illustrate the general point raised above, I will discuss the Navy's highest-priority 6.2 program, the Office of Naval Technology's High Gain Initiative, or HGI. The objective of the HGI is to determine the physical and technological limits of passive acoustic submarine detection by fixed undersea surveillance arrays. The underlying driver for this program is the rapidly quieting Soviet submarine threat. Answers to the questions being pursued in HGI will profoundly affect the entire posture of the U.S. in terms of how it will conduct ASW operations in the post-2000 era.

From the Navy point of view, satisfying the objectives of HGI is a critical goal. Therefore, all technologies necessary to achieving that goal are viewed by the Navy as essential technologies. Moreover, the development of those technologies

must proceed in a focused, integrated manner, if definitive answers are to be achieved in a timely fashion.

To achieve HGI goals, we project that bottom-deployed volumetric arrays, many kilometers on a side, consisting of large numbers of hydrophones will be needed. But to fully exploit the detection power of such an array, detailed knowledge of the ocean, accurate knowledge of the location of each hydrophone, and advanced signal processing algorithms will all have to be brought to bear. Breaking the task down one level further, we understand that at least the following technologies are absolutely critical to achieving HGI's objectives:

Low-cost hydrophones and hydrophone arrays
Advanced cable dynamics
Low-loss fiber-optic transmission cables
Mesoscale ocean modeling -- nowcasting and forecasting
High-resolution acoustic tomography to estimate the three-dimensional ocean sound speed structure
Improved three-dimensional, broad-band acoustic propagation models
Matched field signal processing
High-resolution acoustic noise characterization
Adaptive signal processing
Advanced simulation capability
Massively parallel supercomputers

All of these technologies are being explored, applied, developed, matured, and demonstrated within HGI's integrated program of sea tests, theoretical and data analysis, simulation, and hardware/software development. Some but not all of these are DOD critical technologies, and HGI is leading the technological "charge" in most of these areas -- for both the DOD and the Navy-identified technologies. In some technologies, HGI is taking advantage of developments elsewhere, such as the DARPA/industry supercomputer development programs. HGI also serves as a focal driver for other Navy research programs, which coordinate their experimental efforts with HGI sea tests or structure their theoretical efforts around the long-term challenges HGI will be facing. ONR's basic research programs in acoustic tomography, downslope conversion, and advanced signal processing fall into this category. The advanced development community also coordinated their 1989 NEPAC (Northeast Pacific) environmental measurements with the HGI Various Array Sea Test.

If we are to understand how high technology can contribute to fleet operations effectively and if we are to shorten the overly long acquisition cycle, we need to be moving in the direction of more programs like the High Gain Initiative, in which key technologies are developed in concert with each other to achieve mission-essential capabilities. Upon completion of the comprehensive HGI program, the risk associated with decisions regarding full scale development will be markedly reduced compared to a situation where some critical technologies might have been developed aggressively while other essential technologies might have been totally ignored, a situation that can be anticipated if undue emphasis is placed on a few discrete technologies. The key is balance in the DoD Science and Technology program: a broad generic technology base that gains maturity through focused, integrated, mission-oriented technology programs.

A comparison of Navy technology needs with the DOD critical technology list reveals many similarities. Perhaps this should not be too surprising, since the Navy was an active player in the development of the DOD Critical Technologies Plan. Navy participation included both the policy (steering group) level and the working group. The Navy was instrumental in adding the weapon system environment to the 1990 list due to the heavy influence the ocean environment has on acoustic sensor

performance and its impact on both our active and passive ASW capabilities. Of course, there are other technologies that the Navy supports -- such as underwater propulsion and active sonar -- which are equally essential but tend to be Navy-unique in character.

In summary, the Navy is extremely sensitive to the crucial role of technology and has protected its technology investments even in a declining budget environment. The Navy fully supports the DOD Critical Technologies Plan and is presently investing approximately one third of its Science and Technology resources in those technologies. The Navy also supports other technologies deemed essential to the future mission of the Navy and Marine Corps. However, the Navy continues to hold to the management philosophy that stresses focussing on achieving a mission capability vice focussing on discrete technologies. Accordingly, we believe one improvement for next year's planning process would be to incorporate the DOD Critical Technologies Plan within the DOD Science and Technology Investment Strategy, so that a more explicit linkage between these technologies and mission capability goals would be established. Such a framework would provide the Services with management tools to guide the development of technology within the appropriate DOD context.

Senator BINGAMAN. Thank you very much.

General Condon, did you wish to go ahead now with your comments?

**STATEMENT OF BRIG. GEN. STEPHEN P. CONDON, DIRECTOR, PROGRAM PLANNING AND INTEGRATION, OFFICE OF THE ASSISTANT SECRETARY OF THE AIR FORCE (ACQUISITION)**

General CONDON. Thank you, Mr. Chairman.

I am pleased to appear before you today to review the Air Force's approach for establishing, implementing, and managing our technology base program and also to discuss the 1990 Defense Critical Technologies Plan.

I have a formal statement to be submitted for the record, which I will briefly summarize.

Senator BINGAMAN. That will be fine.

General CONDON. In recognition of a dramatically changing world environment in a time of declining financial resources to be spent for defense, the Air Force has established an investment strategy, which includes as one of its key elements the maintenance of our technological superiority.

In order to maintain technological superiority, we must have a strong science and technology program. The program must include the nurturing of evolutionary technologies, that is, technologies from which we expect steady and continuous improvement, as well as revolutionary technologies, or those which have the potential for a quantum jump in technological capability.

While our number one S&T role is to develop technologies to improve the war-fighting and deterrent capabilities of our operational forces, we also have to look for opportunities to share appropriate technologies with the civilian, commercial sector.

We have long counted on technological superiority in our defense capabilities. The improvements in the quality of potential opponents' systems emphasize that a strong S&T program, managed as a corporate investment, is the cornerstone to our future.

The Air Force actively participated in preparation of both Defense Critical Technologies Plans, and we support the current plan.

In fact, the Air Force S&T plan for fiscal year 1991 has about 30 percent of its $1.4 billion budget for these critical technologies.

We agree with OSD that the next logical step is the integration of the Critical Technologies Plan with a DOD S&T investment strategy. This coupling will provide a defined and audible link between each critical technology and the major long-term military capability goals. The investment strategy will assure that the S&T program is broad enough to prevent technological surprise, is balanced to meet our users' needs, and still provides the revolutionary break-through technological developments that result in a significantly advanced war-fighting capability.

This investment strategy will help the S&T manager focus on capability goals while balancing the investments in pervasive, enabling, and breakthrough technologies.

As mentioned earlier, we must continue to look for ways to share technologies developed to meet military needs with the commercial sector, where appropriate. This is necessary to maintain and enhance the overall technological status of the U.S. industrial base.

The Federal Technology Transfer Act has helped to create an environment to facilitate the commercialization of military-related technologies. Over the years, the Air Force laboratories have made many significant contributions to the U.S industrial base and will continue to do so. One excellent example is in the area of air-breathing propulsion, which is one of the critical technologies in the plan.

Steady investment in this area has resulted in significant advancements and has kept our military and civilian turbine engines the best in the world. Our joint Integrated High Performance Turbine Engine Technology Program is important to maintaining that domination.

I would like to thank this committee for its strong support for the Air Force Science and Technology Program. I also want to reassure you that the Critical Technologies Plan is a key element in the development of our technology investment plans.

We believe we have a well balanced S&T program addressing the critical technologies, as well as the other technologies that are necessary to assure a superior Air Force.

Thank you, Mr. Chairman, for the opportunity to provide this summary of the formal statement, which is submitted for the record. I would be happy to take your questions at the appropriate time.

[The statement of General Condon follows:]

STATEMENT OF

BRIGADIER GENERAL STEPHEN P. CONDON
DIRECTOR, PROGRAM PLANNING AND INTEGRATION
ASSISTANT SECRETARY (ACQUISITION)

MR. CHAIRMAN AND MEMBERS OF THE COMMITTEE:

I am pleased to appear before you to review both the Department of Defense's 1990 Critical Technologies Plan and the Air Force's technology base program for Fiscal Year 1991.

In structuring the Science and Technology investment program we used the overall Air Force investment strategy as the initial baseline. Essentially the Air Force investment strategy recognizes that the financial resources available to meet our commitments are going to be less than in previous years. This means that we must continue to gain efficiencies in the way we do business. Given current budget constraints the Air Force has adopted an investment strategy that has four major points:

- Maintain Readiness
- Maintain technological superiority
- Modify existing systems
- Develop new systems

Today my remarks primarily address how the Air Force plans to "maintain Technological Superiority".

Given this background I would now like to discuss the Critical Technologies Plan and the Air Force Science and Technology program.

The size of the threat to the United States and its allies may be rapidly changing, and there are indications that the military quality of that threat is also changing. In fact, to counter the increasingly highly advanced technological threat we must continue an extremely broad and balanced S&T program from which we can constantly and accurately evaluate threats and select the technologies required for system development, test and evaluation. We must nurture evolutionary technologies, those

which provide steady, continuous improvement over time; as well as pursue revolutionary technologies, those with the potential of providing a quantum jump in technological capability. We must also continue technological advances into support equipment to gain advances in affordability and sustainability and thus in increased combat readiness. System maintainability and reliability is a necessity and must be considered from the inception of system development. And while our number one S&T role is to develop technology to serve the operational Air Force, we recognize that many of our technological developments will also have civilian commercial applications.

A vital element of the Air Force's investment strategy is to maintain technological superiority and the Air Force Science and Technology (S&T) program (of which the technology base is a component) is charged with this responsibility. The U.S. armed forces, in general, and the USAF, in particular, have always depended on technological superiority (quality) to overcome numerical superiority (quantity). Ominously, we now see increased quality in our potential opponents' systems which portends a future of quality versus quality. This new development emphasizes that the Air Force S&T program is the cornerstone of our future.

The Air Force S&T program is managed as a corporate investment with three funding categories; basic research (6.1), exploratory development (6.2), and advanced technology development (6.3ATD). Technology base is composed of the basic research and exploratory development programs. Most of the Air Force's 6.1 efforts are managed by the Air Force Office of Scientific Research and are conducted primarily at universities. The various 6.2 efforts are managed by Air Force laboratories and develop the technologies to the point that feasibility for Air Force applications is demonstrated. The 6.3ATD programs are also

managed by the laboratories and provide the critical integrated component demonstrations that prove military utility at the reduced risk level necessary to make them attractive for incorporation into Air Force systems. Assisting in these efforts are agreements/joint programs with the Army, Navy, DARPA, DOE, SDIO, and NASA which maximize our return on investment and prevent duplication of effort.

We are keenly aware that successful exploitation of technology for complex weapon systems requires the development of a broad set of demonstrated technologies and the people and facilities to exploit it. Although the focus of today's hearing is on the technical side of the program we must not forget that to be successful we must forge a balance between people, facilities, and the technical program. To this end we have made and are continuing to make many changes to improve the way we do business in the Air Force's S&T program. One of the DOD's new key initiatives with active Air Force participation is the Demo Lab program where we have selected two of our centers to experiment with streamlining S&T. The other labs will follow this program closely and offer suggestions. We are also working hard to increase the number of PhDs within our laboratories and to replace our aging facilities on a faster timetable. These are very serious problems. It is especially hard to get sufficient MILCON resources dedicated to S&T in these tight times.

The Air Force actively participated in the preparation of both Critical Technologies Plans. We in the Air Force feel that the process of development as well as the document itself is useful. The process gave us another forum for analysis and cooperation and the Plan provides focus and definition of important technologies for our laboratories, industry, and our international partners. We recognize that the OSD staff with

their capacity to look across DOD departments is uniquely positioned to

provide leadership and focus to bring these technologies along. We agree with OSD that the next logical step in this process is the development of the DoD Science and Technology Program Investment Strategy and the incorporation of the critical technologies into this strategy. This coupling will provide a defined and auditable linkage between each critical technology and the major long-term military capability goals. The resulting investment strategy should be a powerful tool. It will insure our S&T program is broad enough to prevent technological surprise, balanced to meet our users' requirements (which are usually fairly short-term), and still provide those revolutionary break-thru technological developments that provide a significantly advanced warfighting capability. Although this linkage will not be clearly defined this year in the DoD Sience and Technology Investment Strategy or the Critical Technologies Plan, it is clearly a goal worth pursuing in the next installment. This tool will help the S&T manager focus on capability goals while balancing his investments in pervasive, enabling, and breakthrough technologies (some of which are technology limited and not funding limited).

Air Force and private sector laboratories must continue to identify and implement processes that more effectively utilize advanced technologies that were developed for military applications but could significantly contribute to maintaining the United States technological superiority. By enacting the Domestic Technology Transfer Act, Congress has helped create the environment to facilitate commercialization of military related technologies.

A point that was touched on earlier is the dual-use aspect of the Air Force's technology development efforts. The Air

Force laboratories have made many contributions to our nation's industrial base and will continue to do so with our ongoing domestic technology transfer for both military and civilian applications. A striking example of the effectiveness of this process is the technology area of air-breathing propulsion (a critical technology in the Critical Technologies Plan). Through steady investment this technology has evolved steadily since World War II and kept both our military and commercial engines the envy of the world. Our integrated High Performance Turbine Engine Technology (IHPTET) engine program is critical to the continuance of the domination. This program is particularly critical in light of the significant leaps recently made by the Soviets in their fighter aircraft engines. Similarily, the Air Force's recognition of the potential of composites (another critical technology) in aircraft applications in the 50's were pursued in the Air Force laboratories resulting in their use in the F-15 fighter aircraft in the early 70's. These advances are finding wide-spread applications in our commercial aircraft industry today contributing to the United States' strong hold on the world marketplace. For example, there are 3380 pounds of composites in the Boeing 767 contributing not only to weight savings (1238 pounds) but also durability. The National Aero-Space Plane program, a 6.3ATD program, promises revolutionary advances in materials and propulsion. Through these and many other S&T programs we will continue to serve our nation by providing the technology we need when we need it.

In summary I would like to express my appreciation to this Committee for the strong support of the Air Force Science and Technology program. Further I want to reassure you that the Critical Technologies Plan is a key element in developing our technology investment plans. We believe we have a well balanced S&T investment plan that addresses those technologies identified

In the Critical Technologies Plan and other technologies that are necessary to ensure a superior Air Force.

Thank you, Mr. Chairman, for the opportunity to make this statement. I will be happy to answer your questions.

Senator BINGAMAN. Thank you very much, General. Dr. Reis.

**STATEMENT OF VICTOR H. REIS, DEPUTY DIRECTOR, DEFENSE ADVANCED RESEARCH PROJECTS AGENCY**

Dr. REIS. Good afternoon, Mr. Chairman. I am pleased to appear before you to describe DARPA's strategy for establishing, implementing, and managing its technology base activities and how these activities relate to the Defense Department's Critical Technologies Plan.

A requirement in our planning process was to establish priorities among our R&D programs so that we could most efficiently use our resources. We began by selecting seven generic missions for which we expected DOD to have responsibilities later in the 1990s and early in the 21st century. These seven were: deterrence of nuclear war; defense against all-out nuclear attack; engagement in very large-scale conventional war; engagement in regional conventional conflict; monitoring arms control; aiding Third World allies; and activities in counternarcotics and counterterrorism.

These are not meant to be a complete set, but, rather, those that could be most impacted by DARPA activities.

We prioritized these missions based on our assessment of the likelihood that the Defense Department would actually be called on to perform them through the beginning of the 21st century and based on our assessment of the relative impact on the Nation of being properly prepared and performing effectively.

For example, there is an absolute certainty of the need to deter nuclear war, and the importance of successfully accomplishing that mission could not be greater.

Other missions might have lower likelihood or lesser importance.

Then, for each of the missions, now prioritized, we tried to identify those high impact military systems that we would want in the defense inventory later in this decade, or in the beginning of the next century, and which DARPA might develop, because: first of all, the military system could not be built without some major advance in technology or systems concepts; and the military system could be built with some major advance in technology or systems concepts, and we had a promising, even if unproven, idea. All DARPA programs must start with such a good idea. Last, so far as we knew, no one else was working on it or likely to work on it for reasons of risk or for other reasons.

We identified just over 20 such systems, or classes of systems. We prioritized them based on their aggregate impact, if they were in the military inventory, on DOD missions of the future. In doing so, we took into account the breadth and variety of missions that

would be impacted by each system, as well as the priorities of each mission.

For example, radar systems, capable of finding and identifying air targets, despite the application of sophisticated countermeasures by adversaries, are high in priority because they will be extremely important for a number of the seven missions and for the most important of those missions.

Finally, for each of the 20-odd systems, we identified those deficiencies in technology that keep us from having those military systems. By coincidence, we identified over 20 such technologies. Each of those technologies was prioritized in a similar way, namely, based on the breadth and variety of military systems that would be impacted by each technology, as well as the relative priority among the military systems.

These technology priorities form the basis of selecting the technology base programs for DARPA. We have not mindlessly heeded these priorities in establishing our technology base strategy and our fiscal year 1991 budget submission, but this has served as a very useful exercise and an anchor for our thinking and planning.

How do these DARPA technology base programs relate to the Critical Technologies Plan?

Leaving aside the clerical issues of combining and dividing, or naming technology categories, almost all of the DARPA's technology base programs and investments are encompassed by the Critical Technologies List. DARPA has some work in almost all of the critical technologies, and we probably dominate in a number of these, like semiconductor materials and microelectronic circuits, software producibility, parallel computer architectures, machine intelligence and robotics.

Our internal priorities differ a little from those expressed in the plan, primarily in giving somewhat higher weight to information technologies—for example, high performance computing and artificial intelligence. This is understandable, since our focus is on the longer-term, where information may dominate warfare.

We have a comprehensive investment in technology to collect information: passive IR sensors with associated optics, IR laser radars, sensitive radars, chemical and nuclear sensors and others; to transmit information: survivable gigabit networks, laser communications, antennas, and LIGHTSATs; to process information: parallel processing supercomputers, algorithms, artificial intelligence, photonics, computer security, neural nets, high performance microelectronics packaging; to present information: high definition display components; and to make information systems affordable: MIMIC manufacturing technology, infrared focal plan array manufacturing technology, digital semiconductor manufacturing technology, including semiconductor materials and production tools and gallium arsenide, VLSI design tools, rapid prototyping acquisition tools, such as MOSIS and FAST, and software producing tools. These technology elements are the driving force in almost every competitive weapons system we envision for the future.

With the Critical Technologies Plan, the Department is taking the next step in the refinement of its overall technology base strategy. DARPA plays a central role in that strategy, as evidenced by

the correlation between the advanced R&D programs we are funding and those deemed critical by the Department as a whole.

Thank you, Mr. Chairman.

[The statement of Dr. Reis follows:]

PREPARED STATEMENT BY DR. VICTOR REIS, DEPUTY DIRECTOR, DEFENSE ADVANCED RESEARCH PROJECTS AGENCY

Good afternoon Mr. Chairman and members of the committee. I am pleased to appear before you to describe DARPA's strategy for establishing, implementing and managing its technology base activities, and how those activities relate to the Defense Department Critical Technology Plan.

As you know DARPA is chartered with avoiding technological surprise through support of advanced research projects that are commonly characterized as high risk, high impact efforts. Within the Agency we have advanced projects in innovative military systems, in high performance technology, and in manufacturing technology. The intent is to provide the underpinnings of an affordable and flexible defense inventory for later in the 1990s and the beginning of the 21st century. Because of the wide range of our activities "under one roof" we are able to balance technology "push"—opening new opportunities not otherwise conceivable—with military need pull—addressing identified problems of inadequate performance or excessive cost.

All of our work is organized in programs, which are collections of contracts with industry, universities and other laboratories selected and managed so as to achieve a particular goal. Our programs begin only if we have a new if as yet unproven technical idea. Our programs end at a time selected before we begin, to temper the natural inclination to continue things indefinitely. And all of our programs end with a prototype or concept demonstrator, not only with vu-graphs and reports. Our program managers, one for each program, are accountable for getting results along the way within their program, as spelled out in usually quantitative milestones—a measure of achievement.

Most importantly this discipline is tempered by a willingness to change the rules—to pursue a good idea outside an established program, or to change a program plan to an even better one when the unexpected arises as it usually does in the area of advanced R&D.

We have just gone through a fundamental review of our programs as a necessary step toward formulating our fiscal year 1991 budget request now under consideration by the Congress. Good business practice makes such planning desirable. The press of world events makes such planning essential. In light of the declining defense budget, new freedom in Eastern Europe, increasing opportunities for arms control, more sophisticated weaponry in Third World countries, the globalization of technology, and renewed activities in counter-terrorism and counter-narcotics we have to step back and ask the toughest questions about where we are going.

A requirement in our planning process was the establishment of priorities among our R&D programs, so that we could most efficiently use our resources. We began by selecting seven generic missions for which we expected DOD to have responsibilities later in the 1990s and early in the 21st century. Those seven were deterrence of nuclear war, defense against all-out nuclear attack, engagement in very large scale conventional war, engagement in regional conventional conflict, monitoring arms control, aiding Third World allies, e.g. with information and material, and activities in counter-narcotics and counter-terrorism. These are not meant to be a complete set but rather those that could be most impacted by DARPA activities. And there are other ways to express those missions, combining and dividing them to a shorter or longer list.

We prioritized those missions based on our assessment of the likelihood that the Defense Department would actually be called on to perform them through the beginning of the 21st century, and based on our assessment of the relative impact on the Nation of being properly prepared and performing effectively. For example, there is absolute certainty of the need to deter nuclear war, and the importance of successfully accomplishing that mission could not be greater. Other missions might have lower likelihood or lesser importance.

Then for each of the missions, now prioritized, we tried to identify those high impact military systems that we would want in the defense inventory later in this decade or in the beginning of the next century, and which DARPA might develop because:

—the military system couldn't be built without some major advance in technology or systems concepts;

—the military system could be built with some major advance in technology or systems concepts, and we had a promising if unproven idea;
—and, so far as we knew no one else was working on it or likely to work on it for reasons of risk, or for other reasons.

We identified just over 20 such systems, or classes of systems. We prioritized them based on their aggregate impact, if they were in the military inventory, on DOD missions of the future. In doing so we took into account the breadth and variety of missions that would be impacted by each system, as well as the priorities of the missions. For example, radar systems capable of finding and identifying air targets despite the application of sophisticated countermeasures by our adversaries are high in priority because they would be extremely important for a number of the seven missions, and for the most important of those missions.

Finally, for each of the 20-odd systems we identified those deficiencies in technology that keep us from having those military systems with high levels of combat performance and an affordable cost. By coincidence we identified over 20 such technologies. Each of those technologies was prioritized in a similar way, namely based on the breadth and variety of military systems that would be impacted by each technology, as well as the relative priorities among the military systems.

These technology priorities form the basis for selecting technology base programs for DARPA. We have not mindlessly heeded these priorities in establishing our technology base strategy and fiscal year 1991 budget submission, but this has served as a very useful exercise and an anchor for our thinking and planning.

The approach we have taken in DARPA's planning is similar to that in the *Report of the Defense Science Board 1981 Summer Study Panel on Technology Base.* The major difference is that we have focused exclusively on those high risk, high impact projects that fit the DARPA style of organization, and the DSB, with a Department-wide purview, also included an explicit dimension of risk, so as to include lower risk, lower impact projects and long term level-of-effort laboratory investigation.

How do DARPA's technology base programs relate to the Critical Technologies Plan? Leaving aside clerical issues of combining, dividing or naming technology categories, almost all of DARPA's technology base programs and investments are encompassed by the Critical Technologies. DARPA has some work in almost all of the Critical Technologies, and we probably dominate a number like Semiconductor Materials and Microelectronic Circuits, Software Producibility, Parallel Computer Architectures, Machine Intelligence and Robotics, and other categories.

Our internal priorities differ a little from those expressed in the Plan, primarily in giving somewhat higher weight to information technologies, e.g. high performance computing and artificial intelligence. That is understandable since our focus is on the longer term when information may dominate warfare just as platforms and warheads have in the past.

We have a comprehensive investment in technology to collect information (passive IR sensors with associated optics, IR laser radars, sensitive radars, chemical and nuclear sensors and others); to transmit information (survivable gigabit networks, laser communications, antennas, LIGHTSATs); to process information (parallel processing supercomputers, algorithms, artificial intelligence, photonics, computer security, neural nets, high performance microelectronics packaging); to present information (high definition display components); and make information systems affordable (MIMIC manufacturing technology, infrared focal plane array manufacturing technology, digital semiconductor manufacturing technology including semiconductor materials and production tools, and including gallium arsenide, VLSI design tools, rapid prototyping acquisition tools like MOSIS and FAST, software production tools). These technology elements are the driving force in almost every competitive weapons system we envision for the future.

With the Critical Technologies Plan the Department is taking the next step in refinement of its overall technology base strategy. DARPA plays a central role in that strategy, as evidenced by the correlation between the advanced R&D programs we are funding and those deemed critical by the Department as a whole.

Senator BINGAMAN. Thank you very much.
Dr. Duston, why don't you go ahead.

**STATEMENT OF DWIGHT P. DUSTON, DIRECTOR, INNOVATIVE SCIENCE AND TECHNOLOGY OFFICE, STRATEGIC DEFENSE INITIATIVE ORGANIZATION**

Dr. DUSTON. Good afternoon, Mr. Chairman. My name is Dwight Duston. I am the Director of Innovative Science and Technology for the Strategic Defense Initiative Organization (SDIO).

Today I would like to discuss some of the key points regarding SDIO contributions to research in the 20 technical areas comprising the DOD Critical Technologies List.

First, and most striking, is that SDIO sponsored research accounts for almost one-third of the total DOD investment in the critical technologies. In all but three areas, SDIO has a sizable percentage of the total, and in nine areas we contribute more than 30 percent. Let me put these percentages in perspective.

The SDIO budget for fiscal year 1990 is $3.6 billion. Approximately $1.9 billion of this, or a little over 50 percent, is considered "tech base" research and development. Of this, $970 million, over 50 percent of our tech base R&D, falls in critical technology areas.

In the 6 years that SDIO has been sponsoring research, we have contributed over $6 billion—an average of $1 billion per year—to these critical technologies.

The SDIO is committed to maintaining a balanced program; balanced between the demonstration/validation of nearer-term concepts and the research and exploratory development of advanced technologies.

In past years, large budget reductions levied on SDIO have caused us to make major reductions in our planned program. Nevertheless, we have strived to maintain this balance. If reductions are realized in the fiscal year 1991 program, it is impossible to predict the effect on the critical technology investment of SDIO.

The level of our support for these technologies will be dependent upon the size of the cut and any resulting guidance and direction from the President.

In some technologies, SDIO has become the de facto dominant force. Not only has our investment been large, but other services and agencies, seeing our large funding level, have opted to reduce their investment, leaving us a virtual monopoly in areas such as space nuclear power, rocket plume analysis, and gamma ray lasers. If we were to terminate or precipitously reduce our investment in these areas suddenly, entire technical communities that depend on these funds would become disenfranchised.

Let me now address our strategy for investment in these critical areas. The charter of the Strategic Defense Initiative Organization is very explicit. We seek to develop technologies that will allow a defense against ballistic missiles. Our requirements dictate investment in specialized areas of research. Many of these technologies are, as seen from the report, deemed critical by the entire Defense Department. In areas where our interest overlaps with other services and agencies, our needs are often more demanding than theirs. In parameters such as size, weight, power, velocity and reliability, SDIO requirements are often well beyond state of the art, due partly to the hostile space environment in which many of our systems must function.

Where our needs are met by other DOD agencies, we rely heavily on those programs. This is true in areas such as fiber optics, laser diode arrays, and advanced parallel computer architectures, where our investment is small. More often, however, we share needs, and our funding augments the investment by others. Examples of this include high energy capacitor development with the Defense Nuclear Agency; survivable solar power with the Air Force; diamond technology with the Navy; optical computing with DARPA; arcjet propulsion with NASA; space nuclear power with the Department of Energy; and hypervelocity projectiles with the Army.

The coordination between SDIO and the services and agencies in these technologies has been implicit. Let me explain.

The SDI program was established on the principle of centralized management/decentralized execution. Other agencies and services play a key role in executing our program. This means they help us to define areas of investment and requirements, they assist in reviewing proposals and selecting investigators, and, in over two-thirds of our program, they are responsible for the day-to-day management of contracts. That they do this with full cognizance of their own investment strategy in these technical areas is not surprising at all. Moreover, the agent who acts as a program manager for us is, in many instances, the person responsible for that technical area in his parent organization.

Thus, we avoid duplication and excessive overlap with existing DOD programs through this implicit coordination which results from our management structure.

Let me now discuss some of the technical work in areas highlighted by this year's Critical Technologies List.

As I mentioned earlier, we have little or no investment in three areas: machine intelligence and robotics; air breathing propulsion; and biotechnology. On the other hand, we have major investments in two technologies key to strategic defense which are not on the DOD Critical Technologies List: high energy lasers and particle beams—over $600 million per year, and rocket propulsion—over $100 million per year.

As you can see by the chart included in my written testimony, SDIO invests more than 40 percent of the total DOD tech base funding in four areas: passive sensors, sensitive radars, weapon system environment, and hypervelocity projectiles. I would like to give you a brief description of what we are doing in these critical areas.

The cost of individual elements, or pixels, which make up passive sensor arrays is a crucial issue for SDIO. We will need tens of millions of pixels on many different sensors. The cost to manufacture a pixel of mercury cadmium telluride, a leading sensor material, was $20 six years ago. SDIO has made major investments in sensor manufacturability and fabrication, which has now brought this cost down to $5 per pixel. Our goal is to reduce it to less than 50 cents per pixel.

SDIO also funds novel alternative materials, which promise to reduce the cost to less than 10 cents per pixel. Our progress in sensor fabrication benefits not only the entire Defense Department, but the very large commercial sensor market as well.

Our progress in sensitive radars is also noteworthy. A key issue for strategic defense is whether one can discriminate between re-entry vehicles and decoys during the mid-course phase of a ballistic missile's trajectory. Our FIREPOND facility, near Lincoln Labs in Massachusetts, is demonstrating our ability to solve this challenging problem. Last month, we conducted the FIREFLY experiment in which a laser radar on the ground was able to image a rocket launched from Wallop's Island, Virginia, including an event which mimicked a decoy and re-entry vehicle deployment.

The demonstration successfully discriminated between the two objects at a distance of over 800 kilometers.

SDIO also conducts innovative research, like differential absorption lidar and amplitude interferometric imaging, that use sensitive laser radars in completely novel ways. Benefits of this research will affect other missions, such as arms control verification, in addition to our own SDI goals.

Another factor key to our success against the threat is the ability to pick out missiles against the background. For this reason, we have a large investment in weapon system environment. We call it "phenomenology and measurements." SDIO is continuously collecting data in space, in the air, and from the ground, about radiation and particles that make up the background against which we seek out our targets. Because the target may change its signature several times, our data collection spans many parameters in the electromagnetic spectrum, in temperature, in direction, in season, and in sunlight or the dark of night. In addition to helping us locate our targets, the huge data base we are compiling will provide much useful data for those interested in global radiation and environmental change.

Finally, in the area of hypervelocity projectiles, SDIO is aiming for incredibly smart bullets. Interceptors are a major thrust in our research. Although near-term concepts employ chemical propulsion to accelerate them, our goal is to provide electromagnetic launch to hypervelocities which will reduce our required warning time as well as our intercept duration. Through our projectile program, SDIO has achieved amazing reduction in size and weight of inertial guidance systems, sensor focal planes, high speed processors, accelerometers, and divert propulsion systems. Our ultimate goal is to reduce a guided projectile to less than 500 grams, about the size and weight of a can of coffee—a coffee can that can fly 1,000 miles across space and smash a ballistic missile in flight.

In summary, SDIO has made major investments in research areas deemed critical to this Nation's national security. We have rapidly accelerated progress in many of these areas, and we can document these claims of progress with existing demonstrable hardware.

SDIO has worked closely with its colleagues in the Department of Defense to invest our funds wisely and with a coordinated strategy. This report will make our efforts easier and more effective, and we are pleased to have participated in this study and also to have made a contribution to this valuable report. Thank you.

[The statement of Dr. Duston follows:]

PREPARED STATEMENT BY

**Dr. Dwight Duston**
**Director**
**Innovative Science & Technology Office**
**Strategic Defense Initiative Organization**

Good afternoon, Mr. Chairman and members of the subcommittee. My name is Dwight Duston and I am Director of Innovative Science and Technology for the Strategic Defense Initiative Organization. I would like to discuss some key points regarding the SDIO contributions to research in the 20 technical areas comprising the DoD Critical Technologies list.

First, and most striking, is that SDIO-sponsored research accounts for almost one-third of the total DoD investment in the critical technologies. In all but three areas, SDIO has a sizeable percentage of the total. And in nine areas we contribute more than 30 %. Let me put these percentages in perspective.

The SDIO budget for FY90 is $3.6B. Approximately $1.9B of this, or a little over 50%, is considered "tech base" research and development. Of this, $970M, over 50 % of our tech base R&D, falls in critical technology areas. In the six years that SDIO has been sponsoring research, we have contributed over $6B, an average of $1B per year, to these critical technologies.

The SDIO is committed to maintaining a balanced program; balanced between the demonstration/validation of nearer-term concepts and the research and exploratory development of advanced technologies. In past years, large budget reductions levied on SDIO have caused us to make major reductions in our planned program. Nevertheless, we have strived to maintain this balance. If reductions are realized in the FY91 program, it is impossible to predict the effect on our critical technology investment. The

level of our support for these technologies will be dependent upon the size of the cut and any resulting guidance and direction from the President.

In some technologies, SDIO has become the de facto dominant force. Not only has our investment been large, but other services and agencies, seeing our funding level, have opted to reduce their investment, leaving us a virtual monopoly in areas such as space nuclear power, rocket plume analysis, and gamma ray lasers. If we were to terminate or precipitously reduce our investment in these areas suddenly, entire technical communities that depend on our funds would become disenfranchized.

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Another factor key to our success against the threat is the ability to pick out missiles against the background. For this reason we have a large investment in weapon system environment...we call it phenomenology and measurements. SDIO is continuously collecting data in space, in the air, and from the ground about radiation and particles that make up the background against which we seek out our targets. Because the target may change its signature several times, our data collection spans many parameters in the electromagnetic spectrum, in temperature, in direction, in season, and in sunlight or the dark of night. In addition to helping us locate our targets, the huge data base we are compiling will provide much useful data for those interested in global radiation and environmental change.

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Department of Defense to invest our funds wisely and with a coordinated strategy. This report will make our efforts easier and more effective. We are pleased to have participated in this study and to have made a contribution to this valuable report.

## SDIO SUPPORT OF DoD TECHNOLOGY BASE

| DoD Critical Technologies | Percent Of DoD Research Funded By SDIO |
|---|---|
| • Semiconductor Materials And Microelectronic Circuits | 14.7% |
| • Software Producibility | 16.2% |
| • Parallel Computer Architectures | 18.3% |
| • Machine Intelligence / Robotics | 1.7% |
| • Simulation And Modeling | 28.6% |
| • Photonics | 12.0% |
| • Sensitive Radars | 40.9% |
| • Passive Sensors | 77.0% |
| • Signal Processing | 34.6% |

# SDIO SUPPORT OF DoD TECHNOLOGY BASE (Cont'd)

| DoD Critical Technologies | Percent Of DoD Research Funded By SDIO |
|---|---|
| • Signature Control | $25M |
| • Weapon Systems Environment | 58.8% |
| • Data Fusion | 20.0% |
| • Computational Fluid Dynamics | 10.0% |
| • Air Breathing Propulsion | 0.0% |
| • Pulsed Power | 32.4% |
| • Hypervelocity Projectiles | 45.0% |
| • High Energy Density Materials | 33.3% |
| • Composite Materials | 30.6% |
| • Superconductivity | 32.3% |
| • Biotechnology | 6.2% |

## 1. Semiconductor Materials and Microelectronics

| | |
|---|---|
| – Advanced Electronic Materials | 2 |
| – Diamond Semiconductors | 3 |
| – Rad–Hard VLSI Technology Development | 29 |
| – Rad–Hard Subsystems for Space Based Processing Technology | 16 |
| **SDIO** | $ 50M |
| **Total DoD/DoE** | $340M |
| SDIO Percentage of Total DoD/DoE | 14.7% |

## 2. Software Producibility

| | |
|---|---|
| Reusable Software | 4 |
| Fault Tolerance | 6 |
| Secure Software | 4 |
| Manufacturing Producibility | 2 |
| Software/System Engineering Dev. | 5 |
| Total (SDIO) | 21M |
| Total (DoD/DoE) | 130M |
| Percentage | 16.2% |

## 3. Parallel Computer Architecture

| | |
|---|---|
| Algorithm Development | 8M |
| Parallel Processor | 3M |
| Self Adaptive Processor | 5M |
| Optimal Architecture Development | 2M |
| Effective Compiler for Parallel Arch. | 4M |
| TOTAL (SDIO) | 22M |
| TOTAL (DoD/DoE) | 120M |
| Percentage | 18.3% |

## 4. Machine Intelligence/Robotics

| | |
|---|---|
| Development of Intelligent Machines | 2M |
| TOTAL (SDIO) | 120M |
| TOTAL (DoD/DoE) | 1.7% |

## 5. Simulation and Modeling

| | |
|---|---|
| National Test Bed (Battle Management) | 20 |
| Exoatmospheric Testbed | 3 |
| Architecture Analysis | 5 |
| Discrimination Architecture | 2 |
| Red/Blue Simulation Studies | 10 |
| Human Engineering and Training | 5 |
| Battle Management/C3 Exp. System | 15 |
| TOTAL (SDIO) | 60M |
| TOTAL (DoD/DoE) | 210M |
| Percentage | 28.6% |

# 6. Photonics

| | |
|---|---|
| National Test Bed | 4M |
| Brilliant Pebbles | 3M |
| Photonic Computing | 3M |
| Optoelectronics | 2M |
| TOTAL (SDIO) | 12M |
| TOTAL (DoD/DoE) | 100M |
| Percentage | 12% |

# 7. Sensitive Radars

| | |
|---|---|
| Laser Radar Component Development | 14 |
| Laser Radar Technology Development | 25 |
| Laser Radar Measurements | 6 |
| TOTAL (SDIO) | 45M |
| TOTAL (DoD/DoE) | 110M |
| Percentage | 40.9% |

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## 8. Passive Sensors

| | |
|---|---|
| VUE and Special Projects | 14 |
| Detector Optics Technology | 39 |
| Infrared Focal Plane Technology | 29 |
| Cryocooler Technology | 10 |
| Advanced Sensor Components | 5 |
| Sensor Diagnostics | 13 |
| Sensor Discrimination Technology | 32 |
| EDX Sensor Development | 40 |
| MSX Target Support | 20 |
| Midcourse Space Exp | 25 |
| IBSS | 15 |
| SATKA System Studies | 11 |
| BSTS/SSTS Sensor Development | 102 |
| TOTAL (SDIO) | 355 |
| TOTAL (DoD/DoE) | 460 |
| Percentage | 77% |

## 9. Signal Processing

| | |
|---|---|
| Real-Time Signal Processing | 25M |
| EDX Experiment | 3M |
| Midcourse Space Development | 5M |
| BSTS/GSTS/SSTS Signal Processing | 12M |
| TOTAL (SDIO) | 45M |
| TOTAL (DoD/DoE) | 130M |
| Percentage | 34.6% |

# 10. Signature Control

| | |
|---|---|
| Measuring of Target Signatures | 3 |
| Visible, IR, and UV Signature Reduction | 5 |
| Survivability of Space Assets | 4 |
| Structure and Shaping for Low Obs. | 3 |
| Low Observable Design in BSTS/SSTS/BP | 10 |
| Total (SDIO) | 25M |

A significant portion of the total DoD/DoE budget in this critical technology

## 11. Weapon Systems Environment

| | |
|---|---|
| MSX Operations and Launch Services | 17M |
| Midcourse Space Experiment | 20 |
| STARLAB Boosters | 25 |
| NTB Secure Models for Operation | 15 |
| BSTS/SSTS/GSTS Remote Sensing | 23 |
| Total (SDIO) | 100M |
| Total (DoD/DoE) | 170M |
| Percentage | 58.8 |

## 12. Data Fusion

| | |
|---|---|
| KBS Data Fusion Program | 3 |
| Battle Management Data Processing | 2 |
| System Integration (BSTS, GSTS, SSTS) | 5 |
| Total (SDIO) | 10M |
| Total (DoD/DoE) | 50M |
| Percentage | 20% |

## 13. Computational Fluid Dynamics

| | |
|---|---|
| Advanced Interceptors (Hypersonic) | 3 |
| Ground Based Interceptor Technology | 5 |
| Total (SDIO) | 8M |
| Total (DoD/DoE) | 80M |
| Percentage | 10% |

## 14. Air Breathing Propulsion

SDIO spends a significant amount of dollars in rocket propulsion research which has a strong synergism with existing NASA programs. However, SDIO is not spending any funds in air breathing propulsion.

## 15. Pulsed Power

| | |
|---|---|
| NPB Power System Development | 8 |
| Railgun Power System Dev. | 9 |
| MHD Technology | 3 |
| SP-100 Power Demo | 10 |
| Advanced Solar Concepts | 6 |
| Space Power Experiment | 2 |
| Opening/Closing Switches | 5 |
| Pulse Forming Networks/Lines | 4 |
| Capacitor Development | 2 |
| Interactive Space Power | 2 |
| Thermoionic Fuel Elements | 4 |
| Total (SDIO) | 55M |
| Total (SDIO/DoE) | 170M |
| Percentage | 32.4 |

## 16. Hypervelocity Projectiles

| | |
|---|---|
| D-2 Projectile Development | 11 |
| Hypervelocity Experiments | 8 |
| Guided Projectile/Interceptors | 10 |
| Lethality Studies on Hypervelocity Projectiles | 20 |
| Smart Projectile Design | 7 |
| Materials/Structures | 3 |
| Projectile Integration | 4 |
| TOTAL (SDIO) | 63M |
| TOTAL (DoD/DoE) | 140M |
| **Percentage** | 45% |

## 17. High Energy Density Materials

| | |
|---|---|
| Materials for Kinetic Energy Propulsion | 8 |
| Orbit Transfer Propulsion Systems | 7 |
| Advanced Propellants | 2 |
| Strategic Missile Propulsion | 13 |
| Total (SDIO) | 30M |
| Total (DoD/DoE) | 90M |
| Percentage | 33.3% |

## 18. Composite Materials

| | |
|---|---|
| Advanced Structural Composites | 3 |
| Advanced Optical Materials | 2 |
| Advanced Materials for Space Structure | 15 |
| Space Structure Technology | 3 |
| Macromolecular Structures | 2 |
| BSTS/GSTS/SSTS/BP/SBI Material Dev | 27 |
| Total (SDIO) | 55M |
| Total (DoD/DoE) | 180M |
| Percentage | 30.6% |

## 19. Superconductivity

| | |
|---|---|
| High Temp Superconductors | 5 |
| High Current Conductors | 2 |
| Electronic Applications | 7 |
| Superconductive Magnetic Energy Storage | 25 |
| Free Electron Laser | 3 |
| Total (SDIO) | 42M |
| Total (DoD/DoE) | 130M |
| Percentage | 32% |

## 20. Biotechnology

| | |
|---|---|
| Medical Free Electron Laser | 4 |
| Positron Emission Thermography | 2 |
| Total (SDIO) | 6 |
| Total (DoD/DoE) | 97M |
| Percentage | 6% |

Senator BINGAMAN. Thank you very much.

Mr. Singley's suggestion is that we require a DOD Technology Master Plan. I guess there is something in the works that is similar to that that Dr. Herzfeld testified to us about before. I would be interested in comments by any of the rest of you as to the appropriateness of that or whether you think that is presently forthcoming, and whatever you can say about the need for some larger master plan, which would presumably put some of this critical technology work in better perspective, as far as other things that DOD is doing.

Do any of you have thoughts on that? Dr. Reis.

Dr. REIS. Yes. That process is starting. I participated with Dr. Herzfeld and many of the senior staff members last Thursday and Friday on the kickoff meeting of that. In addition, a number of participants were people like Johnny Foster, who is now the head of the Defense Science Board, a former DDR&E; a number of people from the policy shop; Andy Marshall, from Net Technical Assessment; and I believe Dr. Herzfeld calls it "Investment Strategy and Action Plan."

I guess I would concur with Mr. Singley that that really does appear to be an appropriate way of going. At least we are starting out from a top-down, integrated approach, looking across all the DOD needs, integrating it in with the people who are concerned from the policy aspect, in terms of their views what the future might be. At least we have gotten off to what I think is a very vigorous start on that process.

I think the approach of the critical technologies—it's a little early to say, but I think that will integrate extremely well into that process.

Senator BINGAMAN. Okay. Does anyone else have comments on that?

General.

General CONDON. Yes, sir. I agree as well. It is my understanding that the next step in this process intended by Dr. Herzfeld and his people is the integration of the Critical Technologies Plan into the DOD Investment Strategy.

We concur that that is an approach that makes a lot of sense because it then enables us to link those critical technologies directly with some overall military capability goals. We think that is a very positive step.

Senator BINGAMAN. Okay. Let me ask what is the involvement of industry in the various planning efforts that you have all described here? Is industry integrally involved, or do they sort of comment after you have it drafted?

What is the involvement there? Mr. Singley, did you have a point of view on that?

Mr. SINGLEY. Yes, sir.

When we were putting together our first master plan, there was quite a bit of dialogue about whether it should be just within the Army or at least outside. I'm glad to say that we decided to make a broad distribution. We published it both in a classified form and also in an unclassified form. It is available to all contractors through DTIC. We found that to be a very efficient, effective way to get it out in the broadest sense.

We also have had the Army Science Board review it, which, of course, has many key people from industry and academia. We have the Board on Army Science and Technology out of the National Academy of Sciences, as I mentioned in my testimony, reviewing it, and it should be finished next summer. Of course, the results of that are being cranked into the revision to the master plan that we are currently working on.

So we view that as a very helpful critique and as very much a strengthening contribution to our plan. Also, we wanted to release the master plan to industry to give them an idea as to where the Army is going and what opportunities there might be for them, particularly with respect to their IR&D investment. We have seen that kind of dialogue and feedback come to pass. So we think that is an effective way to approach it.

Senator BINGAMAN. Okay. Dr. Selwyn, did you have a comment?

Dr. SELWYN. I wanted to pick up on the last point.

We have been very fortunate in the Office of Naval Technology that the Navy's oversight of the IR&D program is located within my office. We have recognized that the classic problem of trying to

communicate to industry what it is we are doing and where we expect to be going has been a major difficulty. Beginning about 4 or 5 years ago, when we first began preparing the mission area strategies that I referred to during my statement, we immediately took steps to issue them in classified, but sanitized form—"sanitized" in the sense that funding information and proprietary information were excised from them. Industry has had full access to them for the very same purpose that Mr. Singley has said that we want to ensure that industry is in the best position to target their IR&D. That seems to be working quite well.

Senator BINGAMAN. Dr. Selwyn, you may have referred to this in your comment.

Do you have a written plan as to what your strategy is and what areas of technology you consider critical over the next several years?

Does the Navy have that?

Dr. SELWYN. Absolutely.

We have been issuing that plan since 1986 on an annual basis, and that is the plan I am referring to.

Senator BINGAMAN. Is that both classified and unclassified?

Dr. SELWYN. We have not issued it in an unclassified version. We have not found it necessary, until now, to do that. We might want to reconsider that. Much of our work, particularly the most important areas, ASW and submarines, tend to be very sensitive and almost impossible to present at an unclassified level. So, it winds up being that only an important subset, but nevertheless a subset, would be able to be released unclassified.

Senator BINGAMAN. General, do you folks have in the Air Force a similar written plan as to where your funding is going and what areas you consider most critical?

General CONDON. Yes, sir, we do.

We recently published the second of what we call "Technology Area Plans." It is a compendium of 12 separate volumes, one for each of the major technology areas. Those documents are unclassified. They are distributed to industry and made available basically to those people who are qualified and who choose to see them, so that they can get an idea of the technologies that we think are important and the directions that we think we need to pursue in those areas. Each one of those documents has in it, for its subset of technologies, a roadmap that shows, for the next several years, the kinds of developments that we see as needed in order to further that technology.

We also found that to be a very useful tool for communicating with industry, as well as getting feedback.

Senator BINGAMAN. To what extent are process technologies the technologies needed to actually manufacture the weapon systems that you are contemplating needing down the road? To what extent are those included in the areas that you are giving priority to in the Air Force, for example?

General CONDON. It is pretty much integrated in all of those, although as you are aware, I am sure, we do have an extensive manufacturing technology effort underway at Wright Paterson Air Force Base. But, basically, they process kinds of technologies, not only for manufacturing but also for other areas such as software,

are included and integrated right into the plans for each of those major technology areas.

Senator BINGAMAN. Let me ask about SDI. One concern I have is, when you get out the list for requests for funding related to these 20 critical technologies that DOD has identified, the lion's share, or the largest of the contributions being made to funding in these areas is the SDIO contribution.

I think you made the point, Dr. Duston, that your funding level is at risk here in the Congress, and I think probably more at risk than the funding level of other parts of the Defense Budget, because it has been a highly politicized area of endeavor, ever since it was announced by President Reagan in 1983.

It concerns me, quite frankly, that we are putting so much of the dollars that we are depending upon in these research areas, where we are proposing to channel so much of that through your budget. And, as you say, you cannot tell me what is likely to come out at the other end of the channel and whether you are going to be able to provide adequate funding in these areas or not.

Do you have any thoughts here? I guess there are two alternatives. One is that we should adequately fund you, which is something which is a little above my pay grade around here. [Laughter.]

Senator BINGAMAN. The other one is that we should take the funding that is in your budget related to these critical technologies out of your budget and put it somewhere else, so it is not so subject to annual attack.

Do you have some thoughts on that?

Dr. DUSTON. As a civil servant, I might say that certainly what you say are two viable alternatives.

Let me go back historically and remind you, Mr. Chairman, that SDIO investment in technology 6 years ago, when we started, was an augmentation of the existing tech base in the DOD. So, when Congress voted a budget for SDI in fiscal year 1985 for the first time, that represented—not entirely but certainly a good percentage, and as the budget grew as well—a major new augmentation for technology investment in the Department of Defense. In other words, budgets in other 6.1 and 6.2 lines within the DOD were not reduced significantly. Some exchanges took place, and one that particularly comes to mind is the directed energy program in DARPA, which I believe was about $350 million at the time and it was consumed by SDI, but then grew to $900 million.

So, this was an augmentation to a certain extent.

On the other hand, as you raised the issue of machinations of the SDI budget, I guess my comment is if your intention is to protect technology investment in the DOD, you certainly have both of those alternatives open to you. Obviously, I would prefer the former to the latter. What the latter does, in the large, is protect the DOD investment technology. However, from SDIO's point of view, in emphasizing, and continuing to emphasize through our balanced program of far-term efforts—directed energy, follow-on technologies in laser satellite communications and space nuclear power—that would greatly decimate our coordinated and integrated efforts to pursue those advance technologies.

Senator BINGAMAN. One other concern I have about having so much of this funding in your budget is you do not, in the budget

you submit to the Congress, break out the technology base activities as a program or project element, as I understand it. You just give us a lump sum.

This doesn't allow a great deal of visibility by Congress as to what is actually happening here and doesn't really give us the opportunity to feel confident that the funding is, in fact, going where it is intended to go, where we think it should in some of these areas.

I don't know if you have any thoughts about how we could fix that—even if we left the funding in your budget.

Dr. DUSTON. Let me reassure you that for the first time this year—and I will put in a pitch concurrently here for the DOD Investment Strategy Document, which I represent SDI on also, in addition to the Critical Technologies List—that for the first time this year in the Investment Strategy Document we have done exactly what you are now requesting.

Since the Investment Strategy for Science and Technology emphasizes 6.1 through 6.3(a) work, we—and I know because I did a major portion of that work—sat down and went through every program element in the SDI and explicitly pulled out science and technology investment.

So, when that document is released, I believe some time in the next several months, you will be able to go through there and see how much of the total appropriation for SDI is invested in each specific technological area.

Now, this year it is not parallel, not coordinated totally with the 20 Critical Technologies List. I believe we broke that out into technologies of roughly eight or nine categories. If we follow the recommendations of my colleagues here on the panel, and mine as well, that we integrate that for next year, then I can assure you that exactly the explicit breakout of SDI funds in 6.1, 6.2, and 6.3(a) in these 20 critical technologies would be readily available and easily discernible.

Senator BINGAMAN. Let me ask the Air Force how the Air Force is structured to oversee and manage the tech base activities.

I have the impression, General, that you are the only one who is here today who is a uniformed officer in your service. I gather there is no civilian position in the Air Force which really has authority in these areas comparable to the civilian position in the other two services.

Is that right or wrong?

General CONDON. Let me describe it this way.

I work for Mr. Jack Welch, who is the Assistant Secretary of the Air Force for Acquisition, and he, of course, is a civilian. He is the one who ultimately has responsibility for the entire Air Force S&T program. I am basically his staff agent to work the scientific and technology program for him.

As you are aware, most of the scientific and technology work done in the Air Force is done in the Air Force Systems Command, and we look to Maj. Gen. Bob Rankine, who is the Deputy Chief of Staff for Science and Technology at Systems Command to be the individual responsible for the administration of that program, based on the guidance of my boss, Mr. Welch.

So, in one sense, we are different from the way the other services are organized. But General Rankine and the Air Force Systems Command Laboratory Program responds to guidance that is issued annually by Mr. Welch.

Senator BINGAMAN. I guess my concern is in the issue of continuity of your program.

I don't know but I assume that your length of stay in this position is going to be relatively short. That is generally the case, I think, as you move up through a career in the service.

If we had a civilian who was responsible, who could stay in that position for a longer period of time, would that be a benefit or a detriment, in your opinion?

General CONDON. Well, I think that, historically, the organization that we currently have has been very responsive as well as very productive in the science and technology area. Certainly, the civilian continuity is a plus throughout the system. We have that civilian continuity in the execution of the science and technology programs at the laboratory level.

Many of our laboratory directors are civilian. In those cases where we have a military director, we have, typically, a civilian deputy director.

So, I believe, again, based on the demonstrated performance, the system that we have works, and we do have the continuity at the field level.

Senator BINGAMAN. Let me ask each of you about an issue that we have to settle on here this year.

In last year's Defense Authorization bill, we directed that DOD designate a lead agency on each of these critical technologies. Once they identified a critical technology, it seemed to me that not all work should be done or managed by a particular agency, but that one agency should be the lead in the sense that it would be the one that had some responsibility for advocating adequate funding throughout the Department of Defense in that area and for monitoring it.

That was not done. It has not been done as yet. It still seems to us that that might be a good idea. It seems there are some very obvious lead agencies for some of the critical technologies, and some of you mentioned that in your own testimony, where there are particular ones of these technology areas that you have given particular attention to.

What thoughts do you have, any of you, about the appropriateness of the Department of Defense, at least? It is very possible that Dr. Phillips or his panel would decide that there should be a lead agency, government-wide, and NASA or some other agency would be made lead agency on one or more critical technologies.

But, within the Department of Defense, at least for those 20 technologies that DOD has identified, should there be a lead agency in your view?

Dr. Reis, did you have any thought on that?

Dr. REIS. This is fairly easy for us to say at DARPA because we don't get into a program unless we feel we can be the lead agency and where we can invest a significant amount of our somewhat limited resources in one or another one of these agencies. So we

don't even start unless we can be the lead agency, and I think Congress understands that and they come to us sort of directly.

In certain other areas, it is fairly obvious that Selwyn is going to be the lead in those things that have to do with Navy-related things. I think it is fairly appropriate that in SDI areas, high energy lasers and some of those come across fairly well.

On some other aspects, it is a little difficult to say there should be one agency, particularly as you get down to the more basic science areas, like in materials, for example. All of us do work in materials. It is a little hard to break up. All of the services have needs, very, very specific needs in those areas.

I know it is simpler for you and sometimes it is simpler for us to have just one person to call up and deal with. Particularly as you get down into the 6.1 level, it is very difficult to say there should be one lead agency, because all of the components have significant responsibilities and needs, as one gets further on.

So, perhaps some sort of mix, if you will, a mixed strategy would be more appropriate there.

Senator BINGAMAN. Any of the rest of you have thoughts on this?

Dr. SELWYN. I would like to comment that there were remarks made both by Dr. Phillips and Dr. Faught that are worth thinking about in the context of your question.

From time to time, I have sat in on some of the policy forum meetings on the AIA study. My impression is that the reason that there has been able to be the emergence of a consensus on a number of these technologies is because they are trying to focus on the generic, transcendent technologies (rather than product-specific technologies).

I heard Dr. Phillips say that he anticipates the OSTP list of critical technologies being generic and transcendent. I think, to the extent that these technologies are generic and transcendent, or foundational technologies, the concept of lead services is very hard to envision for those of us who are working on a day-to-day basis. This is because these are really the tools of the trade. They support us all. We need to be using them, working on them, ensuring that they are integrated with the other things we are doing, and I think that the overall efforts in these technologies are large enough that the United States does not have a critical-mass issue, in terms of subcritical funding through the present structure.

So we're going to have to bear in mind that these are the tools of the trade. You would no more say the Army should be in charge of calculus and the Air Force should be in charge of chemistry and the Navy should be in charge of physics. You have to recognize that these are transcendent. We all use them, and we have to coordinate activities.

On that last point, I want to say that I have recently been made the Chairman of the Joint Directors of Laboratories Technology Base Management Panel, which is a subcommittee of the JDL, and the issue we have been working on for the last year deals with coordination. I want to distinguish "coordination" from "leadership." We have now assembled a data base of all the coordination mechanisms within the Department of Defense for technology and we use these to ensure that the coordination is adequate, determine where

there might be duplicative coordination or where there may be gaps. This is a new initiative, but I think it will be very promising, because none of us wants to duplicate effort. None of us wants to be subcritical. The issue here is ensuring that the work is coordinated.

Senator BINGAMAN. Let me just ask this. Take a specific example, one of these Group A technologies, identified in this year's report such as photonics. Is it your thought that DOD should have centralized in the Office of the Secretary of Defense the competence and the capability to do this coordinating function for the research being done on photonics across the various services and offices, or who should have the responsibility of integrating that and coordinating that?

Dr. SELWYN. Well, I think, in general, the ideal situation would be on those areas where coordination must be ensured, that if the technical talent were available in DOD, as a staff function, that would probably be the best thing.

Alternatively, if DOD satisfied itself that the coordination mechanisms in place at the service level were adequate, then that might be sufficient, too. I think it will have to be judged on a case-by-case basis.

Senator BINGAMAN. But you agree that someone with fairly well developed technical skills has to take the responsibility of ensuring that this coordination does occur in each of these 20 areas?

Dr. SELWYN. In general, that coordination should exist. We already see it, for example, in materials at the OSD staff level, in the form of Mr. Jerry Persh, who does exactly that very effectively.

Senator BINGAMAN. Where is he located?

Dr. SELWYN. He works for Dr. Millburn in DDR&E, and he, for many, many years, has been the guiding force to help the three services. He does not manage their programs, but he certainly helps to stimulate coordination and interaction. I think we get the most for our money out of the materials program by that relationship between DOD coordination and service management.

Senator BINGAMAN. Thank you. Mr. Singley.

Mr. SINGLEY. If I might offer another example, we recently completed, in fact everybody here at this table, in our agency participated in a review of electric gun technology and hypervelocity projectiles. I think this is going to be a success story in terms of laying out at the OSD level, working with the services and the agencies, our roadmap for where we are going in electric guns and hypervelocity projectiles and impact work.

We started out with the requirements, prioritized those, defined the operational capabilities needed, and then worked backward into enabling technologies, the technology demonstration of that, and the critical technologies, many of which are on this list, and laid out a fairly detailed roadmap. That can be a very perishable thing, once that group disbands. If you don't have somebody tracking that and putting some protection in it, to stabilize the program over the long haul, it could all be for naught in a very short period of time.

But I think that is yet another example of how we can bring some focus, continuity and permanence, if you will, to these critical technologies.

Senator BINGAMAN. You're saying that someone has to be there to track that and maintain continuity of the effort.

Mr. SINGLEY. Yes, sir.

Senator BINGAMAN. Would you agree that that not only has to be within the Department of Defense, but we would really need that to track and coordinate between the Department of Defense and other Federal agencies that are also pursuing this, where that exists?

Mr. SINGLEY. Yes, sir.

As I mentioned in my testimony, we are relying very heavily on DOE, for example, Los Alamos, in some of our work, particularly in the areas of armor/anti-armor, and projectile work, and hydrocodes. In fact, we signed MOUs to that effect.

We've done that within the Army. In our Technology Base Master Plan, for example, laid down our key emerging technologies, our technology demonstrations and showed how that fit into our modernization plans. We then translated that, along with the critical technologies, into something we call our Science and Technology Objectives, which are in a separate annex.

In this year's edition, based upon some of the input from industry, we are not only stating specifically what the milestone is, the specific technical accomplishment you want to achieve at that milestone, but also who is responsible for that. So you need to have that kind of network in the case of what we're talking about as well.

Senator BINGAMAN. All right. I think this has been useful testimony. We appreciate it very much.

We will follow up on some of these issues in this year's Defense Authorization bill.

Thank you all very much for coming.

That concludes the hearing.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR MALCOLM WALLOP

Senator WALLOP. At what level will DARPA be able to fund the High Speed Computing Initiative next year?

Dr. REIS. This program builds upon parts of the existing DARPA Strategic Computing Program and parts of related advanced computing programs. The fiscal year 1991 budget for Strategic Computing is $108.7 million of which about one-third is directly related to High Performance Computing.

Senator WALLOP. Will this program run over 5 years or so, or do you expect this to be a long-term DARPA investment?

Dr. REIS. High Performance Computing (HPC) is a long-term DARPA investment that is required to meet the increasing needs of higher performance and more cost effective computing as Defense becomes more dependent on information technology within Defense systems.

[Whereupon, at 4:00 p.m., the subcommittee adjourned, to reconvene upon the call of the Chair.]

# DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1991

FRIDAY, MAY 4, 1990

U.S. SENATE,
SUBCOMMITTEE ON DEFENSE INDUSTRY AND TECHNOLOGY
COMMITTEE ON ARMED SERVICES,
*Washington, DC.*

## DEFENSE INDUSTRIAL ADJUSTMENT AND THE DEFENSE DIVERSIFICATION AND ADJUSTMENT ACT OF 1990

The subcommittee met, pursuant to notice, at 9:33 a.m., in room SH-216, Hart Senate Office Building, Senator Jeff Bingaman (chairman of the subcommittee) presiding.

Committee members present: Senators Bingaman, Levin, and Cohen.

Also present: Senator Riegle.

Committee staff member present: Andrew S. Effron, general counsel.

Professional staff members present: Robert E. Bayer, Michael J. McCord, and William H. Smith.

Minority staff members present: Jonathan L. Etherton, professional staff member.

Staff assistants present: Melissa Ann Ramsey and Debra A. Rice.

Committee members' assistants present: Andrew W. Johnson, assistant to Senator Exon, Kenneth N. Luongo, assistant to Senator Levin, Edward M. McGaffigan, Jr. and John Gerhart, assistant to Senator Bingaman, Jefferson B. Seabright, assistant to Senator Wirth, Melvin G. Dubee, assistant to Senator Byrd, Dale F. Gerry, assistant to Senator Cohen, Charles G. Pearcy, assistant to Senator Lott, and Eric H. Thoemmes, assistant to Senator Coats.

### OPENING STATEMENT OF SENATOR JEFF BINGAMAN, CHAIRMAN

Senator BINGAMAN. The committee will come to order.

Today the subcommittee meets to hear testimony on the impact of impending cuts in defense spending on the U.S. economy in general and on the defense industry more specifically. There is no doubt that we will be looking at significant cuts in defense acquisition in the years ahead.

The subcommittee today seeks to place these cuts in a broader context. How easy will it be for the U.S. economy in general to absorb these reductions? If the impact is likely to be small for the economy as a whole with an annual $10 billion reduction which some have recommended in defense acquisition? In a $5 trillion-

plus economy do we need to pay special attention to certain occupational groups, certain communities which will be disproportionately affected or will the cuts be more significant and require major planning activities by the Government? How do we ensure that the Nation's technological and industrial infrastructure can emerge stronger, not weaker, in the 1990s both to meet our worldwide economic competition and to maintain long term whatever defense capability we may need in an uncertain world? How can we better integrate the civilian and the defense sectors of our economy and to what extent should we specialize in our defense industry and rely on specialization by our allies to cover any gaps?

Senator Claiborne Pell has introduced a bill, the Defense Diversification and Adjustment Act of 1990 that addresses many of the issues surrounding termination or curtailment of defense contracts and closure or realignment of military installations. This is the first Senate bill introduced during this session of the Congress to specifically address the defense economic adjustment issue. It addresses many of the concerns raised across the country regarding the impact of defense cutbacks. It is worth of our careful consideration.

Senator Pell's bill has been referred for consideration to the Armed Service Committee and subsequently to this subcommittee. Senator Pell is with us this morning to testify on the bill, and we welcome him. In addition to his testimony we will hear from two panels of expert witnesses on this important issue.

The first panel following Senator Pell is Dr. Jacques Gansler, who is the Senior Vice President of the Analytical Sciences Corporation. Dr. Gansler is a frequent witness to various congressional committees, and is widely acknowledged for his expertise on defense industrial base and acquisition matters.

Joining Dr. Gansler will be Dr. Gordon Adams of the Defense Budget Project. Dr. Adams has done a careful study of the impact on the economy of changes in the defense budget and presented his results to the Joint Economic Committee last December. Events have continued to evolve at a dramatic rate since then, and we look forward to his testimony on how he now views the situation.

Joining Dr. Gansler and Dr. Adams on the first panel is Professor Seymour Melman, who is a professor emeritus of industrial engineering at Columbia University and Chairman of the National Commission on Economic Conversion and Disarmament. Professor Melman recently authored an article on planning for economic conversion that appeared in the April issue of Nation magazine, and we welcome him, of course.

The third panel is comprised of representatives from industry and from organized labor. Mr. Stanley Pace is the Chairman and Chief Executive Officer for General Dynamics Corporation, one of the largest defense contractors in our country. General Dynamics provides the Defense Department with a wide range of weapons systems, including Trident submarines, M-1 tanks, F-16 fighter aircraft, and Tomahawk cruise missiles.

As defense spending decreases and production of various major weapons systems ceases, General Dynamics will feel the brunt of these changes in many plants and in many ways. Mr. Pace feels strongly enough about making his views known on the defense in-

dustry adjustment issue to have returned for this hearing today from foreign travel, and we appreciate his commitment and sense of duty and look forward to hearing his recommendations on what we need to be doing.

Joining Mr. Pace on the third panel is Mr. Howard Samuels, who is the President of the AFL–CIO's Industrial Union Department. We are pleased that he could take time from his busy schedule to join us today. The brunt of the impending shift from defense and civilian production will be felt by the workers in our defense plants, their families and the communities they live in. It is important that labor and management work together in finding the best solutions to the adjustment process.

Also on our third panel is Mr. William Haggett, who is the Chairman and Chief Executive Officer of Bath Iron Works Corporation. Bath Iron Works is one of the world's foremost warship builders. The United States shipbuilding industry has been in a steep decline, and shipbuilding employment has sharply fallen over the last decade. An almost certain decision to retreat from President Reagan's vision of a 600-ship Navy will cut the size of this industry even more, and we look forward to Mr. Haggett's testimony and recommendations on what we can do to ensure that the Nation maintains an adequate naval shipbuilding capability to meet the uncertain national security challenges of the 21st century.

Before deferring to Senator Riegle for any statement he would like to make, let me just state that I am going to introduce into the record at this point a prepared statement that our majority leader, George Mitchell, has made and asked that we include. His schedule required him to be on the Senate floor at this time, and he was unable to testify, but he was anxious that his testimony be made part of the record on this important issue for his State.

[The prepared statement of Senator Mitchell follows:]

DEFENSE PLANNING AND TRANSITION:
Challenges For the 1990's

Statement of
George J. Mitchell
Senate Majority Leader

The world is changing faster than anyone imagined just one year ago. International economic competition is a fact of life. Events in the Soviet Union and Eastern Europe are redefining our security environment. Along with with Federal budgetary pressures, these factors inevitably will lead to reduced defense spending in the United States. This will in turn affect United States industries, regions and communities.

The 1990's will bring transitions and sometimes difficult adjustments. We face a decade of challenges, but also opportunities.

There is a temptation to look at defense adjustment and planning issues as simply a matter of converting swords into plowshares. There also is a tempation to look to the defense budget as the immediate source for a wholesale, broadly-cut "peace dividend."

Over the next 5 years, we can expect the level of defense spending to decline significantly. At a minimum, we will spend more than $150 billion less than the Administration's current 5-year projections envision. More probably, defense spending will decline between 2% and 5% per year in real, inflation-adjusted terms. For example, Armed Services Committee Chairman Sam Nunn has proposed a reduction in defense budget authority for the next year of at least $25 billion from the Administration's requested amount. Further reductions are

possible, not only next year but in following years.

If world trends continue favorably, we should be able to reduce the proportion of our resources devoted to national defense by as much as $100 billion annually in real terms. Reductions of this magnitude will have an inevitable impact on our military personnel, our local communities, and on our defense industries. I am pleased that the Subcommittee is holding hearings on this dimension of defense planning and transition issues. I especially commend the Subcommittee Chairman, Senator Bingaman, for his attention to such issues.

Reductions in defense-spending cannot be made simply for the sake of budget cuts. Reductions must be based on sound, prudent assessments of shifting national defense needs. They must involve critical decisions relative to military force structure, strategies, and missions. I commend the members of the Armed Services Committee, and in particular Chairman Nunn, for the leadership they are providing in this decision-making process.

At the same time, reductions in the defense budget will not result in an automatic conversion of established defense industries into other enterprises. Economic development---and diversification---never comes easy. Building up an industry or business company, or converting it, often takes years of hard work, and economic risk.

We must recognize also that in the changing strategic environment, some national defense needs and industries may become more important. Even as some military bases may be closed or realigned, or defense programs reduced or

terminated, some bases or programs may need to be reinforced or adapted to fulfill new strategic needs.

These transitions will require careful planning and management. They will require coordination between the Federal Government and State and local governments. Throughout our Nation, the economic fate of individual communities and workers across the country will depend on decisions made by our national defense-planners in Washington just as surely as the lives of ordinary soldiers, sailors, and aircrews depend on decisions made by generals and admirals in the course of battle.

The Federal Government must be prepared to cope with these challenges. This includes providing a structure, whether through the Department of Defense's Office of Economic Adjustment or other mechanisms, that will promote the active participation of State and local interests.

The Federal Government must be prepared for a partnership with American industry in meeting challenges of conversion and competitiveness. It must be prepared to provide assistance to workers and communities during difficult transitions.

The Federal Government also must be vigilant in preserving the national industrial base necessary for meeting our national defense needs. This includes anticipating not just current changes in the world strategic environment, but also future changes. A shipyard closed just because it is thought not to be needed today cannot be simply reopened if it is urgently needed in the future.

The State of Maine has an important stake in these issues and challenges.

Bath Iron Works is Maine's largest single employer and the lead shipyard the Navy's AEGIS destroyer program. Bill Haggett, BIW's Chief Executive Officer and former member of the National Commission on Merchant Marine and Defense, is providing testimony at this hearing. The AFL-CIO's Industrial Union Department, which includes the Machinists Union, whose members include BIW's 10,000 shipyard workers, also is testifying at this hearing.

Portsmouth Naval Shipyard also is located in the State of Maine and employs approximately 8,000 workers. Its importance as the lead shipyard for overhauls of Los Angeles (688) class submarines was reaffirmed in January 1990 by Secretary of Defense Richard Cheney and Navy Secretary Lawrence Garrett. At the same time, Portsmouth Naval Shipyard faces the same pressures from declining workloads as the Navy's other seven public shipyards.

Two Navy shipyards, Philadelphia and Long Beach, have been proposed for closure. I recently met with representatives from those shipyards who were members of the International Federation of Professional & Technical Engineers (IFPTE). I was moved by the eloquence of Mr. Louis Rodriguez, President of IFPTE Local #174 at Long Beach Naval Shipyard and Mr. Howard Landry, President of IFPTE Local #3 of Philadelphia Naval Shipyard. Without necessarily endorsing any of its specific provisions, I submit for the Subcommittee's consideration and hearing record the attached IFPTE position paper and recommendations for defense planning and transition policy.

The State of Maine has numerous other military installations and defense industries: Loring Air Force Base, he Bangor Air National Guard; Brunswick Naval Air Station,in Cutler Naval Installation, Saco Defense, Pratt & Whitney, and Fiber Materials, Inc. All of them play important roles both in our nation's defense and the State's economy.

Loring AFB was slated for closure in the 1970's, but over the past decade has undergone significant modernization. Its strategic location as the Air Force's closest U.S. staging area for the European theater is unique, and its conventional B-52 and KC-135 missions remain important.

Brunswick Naval Air Station plays an equally important role in anti-submarine warfare and the wide-area surveillance of Atlantic sea-lanes. Since 1979, the Navy has spent $52 million in modernizing Brunswick NAS over the past 10 years. The base recently was included on a Navy list as one of several installations under routine, preliminary review for possible closure or realignment; however, no actual proposal or decision has been made in that regard. Nonetheless, the news underscored the importance of the State of Maine to pay close attention to defense planning and transition issues.

That need also has been evident in the closure of Pease Air Force Base, which is directly across the border from Maine in the State of New Hampshire. Pease AFB will be the first closure implemented under the 1988 recommendations of the Commission on Base Closures and Realignment. The Pease AFB closure is demonstrating that closures have impacts which often cut across states lines. The transition planning process should be strengthened to formally take into account regional,

multi-state concerns.

Defense planning and transition policy requires cooperation between Federal, state and local governments. It will require leadership and creative economic development. For the hearing record, I additionally attach a recent editorial from the Bangor, Maine Daily News, which particularly emphasizes the need for Governors, State planning offices, and regional development corporations to participate in that process.

The defense planning and transition process may involve several different functions: assessments, planning, coordination, development, diversification, and/or conversion. It may also require a careful "balancing" of defense interests within a state or region. The State of Maine is proud of its role in national defense, particularly its maritime heritage. At the same time, there may be a legitimate role for State governments in seeking to determine an appropriate balance of defense installations and missions. For example, the State of Maine, through the referendum process, opposes the Navy's testing of cruise missiles in its airspace. The reasons for such opposition are many and diverse---with the nuclear arms control goals principal among them---but the State's concerns include, relative to other military functions and missions performed within the State, the basic question: "Just how much is enough?"

All of these interests, functions, and questions are issues which surround defense planning and transition issues, and are part of the economic challenge of the 1990's. I look forward to the Subcommittee's recommendations as tbe Senate moves to address them.

ATTACHMENT #1 --- STATEMENT OF SENATOR MITCHELL

INTERNATIONAL FEDERATION OF
PROFESSIONAL AND TECHNICAL ENGINEERS
8701 GEORGIA AVENUE, SUITE 701 / SILVER SPRING, MD 20910 / (301) 565-9016

**DEFENSE SPENDING REDUCTIONS: CIVILIAN NAVY EMPLOYEES' PERSPECTIVE**

The eight public shipyards currently located in the United States are vital to our National defense because of their strategic locations and the human and capital resources they offer. While changing world events and economic conditions at home demand reductions in defense spending, closure of any shipyard would, as a practical matter, be irreversible. This means the permanent loss of significant expertise and industrial capabilities which are not found elswhere in American industry. Unlike costly weapons systems, shipyard facilities and labor expertise can serve our domestic economy as well as our defense needs.

Consequently, defense spending reductions which would require the closure of, or significant reduction in force (RIF) at, any shipyard should be authorized only after all the following alternatives have been considered and found to be infeasible.

The use of the shipyard industrial facility and labor force to perform nontraditional, nonmilitary functions.

The use of the shipyard industrial facility and labor force to replace private contractors which perform purely defense functions for profit.

As defense spending is reduced a plan must be developed which reduces the economic impact of domestic base closures and RIF's on employees and communities effected by these decisions. In furtherance of these goals the following safeguards should be put in place:

Top level decisions regarding base closures or substantial RIFs should be based on meaningful consultation with unions representing employees adversely effected by those decisions.

Maximum notice should be given to employees and communities effected by base closures or substantial RIFs. At least one year's notice should be required for base closures and six months' notice for RIFs.

RIFs must be implemented in a fair and equitable manner and only after the Command has reviewed and certified the accuracy of the personnel records of persons effected by the RIF.

Job retraining, placement and relocation assistance must be made available to workers displaced as a result of a RIF or base closure.

Flexible "early out" procedures should be implemented along with any RIF or base closure to assure that adequate numbers of experienced and younger workers are retained.

ATTACHMENT #2 --- STATEMENT OF SENATOR MITCHELL

18 Monday, April 30, 1990

Bangor Daily News

A. Mark Woodward, Editorial Page Editor
Todd Benoit, Assistant Editor
Richard R. Shaw, Editorial Page Assistant

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Editorials

# Defense cuts

Barring an international event that could break the momentum of detente, the mellowing of U.S.-Soviet relations and the underwriting of the peace dividend soon will have unpleasant consequences for the residents of most of the 50 states.

The multi-billion-dollar debate over cuts in the defense budget will produce fallout everywhere, from the cities that manufacture components of the $800-million-per-copy B-2 bomber, to states with bases deemed non-essential in a world without an aggressive Soviet Empire.

Last week, in an aftershock to earlier rumors that regional shipyards might be stranded for work when military programs dry up, the Pentagon confirmed that Brunswick Naval Air Station is one of 34 installations being considered for closure.

The facility employs a total of 4,100 military and civilian personnel. It has an annual payroll of $37 million and pumps another $28 million into the state's economy through the purchase of goods and services. Understandably, Rep. Joseph Brennan, in whose district the air station is located, quickly qualifed the Pentagon hit list as "a very, very preliminary document." Sen. William Cohen, who recently took a dramatic stand against continued funding of the B-2, maintained a better poker face. The Navy, he cautiously advised, is only in the process of doing the important job of reviewing programs and facilities.

Brunswick is big, but Loring Air Base, with approximately 4,000 military and civilian employees and a $92.5 million combined annual payroll, is located in an area that is almost totally dependent on it for economic support. A perennial candidate for curtailment or closure, Loring, too, eventually may make someone's suggested list for economizing.

Having powerful and influential representatives in Congress may blunt the blow to regional economies when bases close and defense contracts disappear, but it is unrealistic to expect in a nation determined to make deep cuts in military spending that any state will come out whole when all 50 are competing for a share of a shrinking defense budget.

Maine has to do whatever it can to hold onto the bases and contracts it has, but it should do what it must to prepare for the inevitable day when changed military missions and new spending priorities bring inescapably bad news.

The Congress has a responsibility to help all states ease the pain of transition from military to peacetime use of land and resources, but Maine, like every other state, has an obligation to its people to prepare them for the worst economically, even while they hope for the best in harmonious international relations.

The governor, the State Planning Office and regional development corporations should be ready to rebut arguments for abandonment by the Defense Department, but they also should have a secure fallback position, where Maine can meet the challenge of economic survival in the absence of a huge annual infusion of Pentagon funds.

Senator BINGAMAN. Senator Riegle, do you have a statement to make? Go right ahead. We are pleased to have you participate in the hearing.

## STATEMENT OF HON. DONALD W. RIEGLE, JR., A U.S. SENATOR FROM THE STATE OF MICHIGAN

Senator RIEGLE. Thank you. I appreciate the opportunity to attend today what is a very important hearing and I want to salute you and the committee for assembling such an impressive array of witnesses that represent a full spectrum of views on one of the most central issues of this new decade, namely, defense adjustment and conversion.

The peace dividend obviously means many things to many people, in part because it has yet to materialize in a very significant way, but that will shortly begin to occur over time. In one sense this peace dividend means new opportunity, the opportunity to place our economy on a sounder footing by shifting resources from military activities to very important and in many cases long overdue civilian pursuits. So, it is easy to get greatly enthused about the possibilities that this creates for our country, and certainly the American taxpayer has earned it. We have spent many, many years devoting a very large part of our public expenditure to military preparedness.

But in another sense to a community heavily dependent upon military bases or production—and that is found literally in all of our 50 States, certainly in my home State of Michigan—the peace dividend can mean a new and difficult challenge. So, no matter how exciting it may be to live in a peace economy for the first time in living memory, and no matter how manageable we may finally enable ourselves to be to undertake this transition to a peace economy, clearly the shift to lower levels of defense spending will pose some very difficult and immediate challenges for many families, communities and companies. This is a necessary and important focus for effort and concern.

So we have to keep sight of both items at the same time. The new possibilities that are open to us and managing as intelligently and as wisely and as sensitively as we can some of the dislocations and adjustments that necessarily have to be part of it. That is why I think this hearing takes on such great importance today.

I take interest in this testimony of expert witnesses both as a representative from my home State of Michigan that will be involved in this transition, but also as the chairman of a task force newly established by the majority leader, George Mitchell. That task force called the Working Group on the U.S. Economy in the 1990s: Productivity and Defense Growth—Productivity, Growth and Defense Adjustment has been created to conduct a strategic review of U.S. economic policy now that the postwar era is essentially coming to an end.

The country needs this strategic review of the outlook with respect to economic policy for the future and growth policy for the future every bit as much as we need a strategic review as we revise our national defense strategy. And certainly Chairman Nunn of this committee has been leading that effort partly with your help

and other members of this committee, Senator Bingaman, and that is a key part of this puzzle as well.

But we must seize the opportunity to substantially increase U.S. productivity to drive up economic growth and output. Clearly the international competitive picture shows the requirement of the United States to now make an economic surge, and this defense adjustment will position us to do exactly that.

So one of the principal focuses of the task force will be to address this question of defense adjustment and what steps can be taken to facilitate the transition for people and companies. In this connection I not only want to commend you again, Senator Bingaman, but also Senator Pell who, like you, serves as a member of the task force and who is working very hard to develop and put forward concrete ideas on this subject, some of which we will hear from him today. So thank you very much for allowing me the chance to participate this morning.

Senator BINGAMAN. Senator Pell, we look forward to hearing your point of view and any statement you would like to make about the legislation you have introduced.

## STATEMENT OF HON. CLAIBORNE PELL, A U.S. SENATOR FROM THE STATE OF RHODE ISLAND

Senator PELL. Thank you very much, Mr. Chairman, Senator Riegle, members of the committee. I really appreciate this opportunity to be here with you discussing this tremendously important question, and congratulate you for your initiative in examining these problems.

In my view, the management of this adjustment is the first order of business in the post cold-war world. It would be ironic if we were unable to manage the readjustment of the tremendous defense industrial base which played a role—a very important role—in bringing us to the position we now find ourselves in.

Moreover, it seems to me that no rational and orderly reduction in defense spending could survive the political process unless there is some system of adjustment in place to protect the interests of the people involved, and today you begin the difficult task of sorting out fact from fiction, relating past experience to future expectations.

Without in any way wishing to pre-judge either the problems or the solution, I want to lay on the record today the background and reasoning behind the legislation which I have introduced and which is pending before this committee, S. 2097, to provide diversification and adjustment after 1990.

The bill was prompted by the perceived needs and interests of my own constituents, but I would like to suggest that maybe the small State of Rhode Island is a useful microcosm of the national problem that you are addressing right here. There are a number of reasons why this is so, but the first is that Rhode Island is all too familiar with the harsh reality of a defense shut-down. We have been through one in the aftermath of Vietnam, and we know all too well that recovery does not occur overnight. That is why lots of people in my State want to see a Federal readjustment program in place.

April 13, 1973 is still remembered as Black Thursday by many Rhode Islanders. On that day, the Department of Defense abruptly announced—by an Assistant Secretary with a suitable name of Mr. Ill—that they were pulling out the 6th Fleet from Newport, decommissioning the Quonset Point Naval Air Station and curtailing other naval activity in the State.

Being a small State, this had a tremendously drastic effect. Thousands of people were thrown out of work, with serious reverberations for the rest of the economy. Of the nearly 36,000 people employed by the Navy in both military and civilian capacities in 1972, only 6,000, or not much more than a fifth, were counted 4 years later. I am pleased to be able to report that the damage has long-since been repaired, and that Rhode Island has regained its economic equilibrium, but it took a substantial amount of government intervention to achieve that result.

All of us would like to be spared the trauma of being caught unprepared in the event history should repeat itself. One of the keys to the recovery was a very creative use of land and facilities declared surplus by the Navy. I am proud to have played a part in the Federal activity which helped bring this about, including funding from the EDA—the Economic Development Administration—and very long and tough negotiations between the Navy and the GSA—the General Services Administration.

As a result, the Navy's deep water piers adjacent to the Newport Navy Base became the home of the Derecktor Shipyard, a hustling enterprise employing as many as 800 people who build Coast Guard cutters, Army tugboats and numerous other vessels and who do substantial maintenance for the Navy.

Across the Bay, the Quonset Point facility became an all-purpose industrial park under State auspices, providing employment for some 7,000 people, again as a result of intense negotiations with GSA to make the land available. And this brings us full cycle, as it were, on the subject of these hearings, for the largest Phoenix to rise from the ashes of the Navy at Quonset Point was a new production facility for General Dynamics Electric Boat Division, builder of nuclear submarines, the Trident ballistic missile submarines and the new Seawolf attack submarines. Electric Boat employees now some 6,000 people at Quonset Point today, and another 3,000 Rhode Islanders work at EB's Connecticut Plant at Groton, making the company the largest private sector employer of Rhode Island workers. This company makes a huge contribution to our State's economy, and we have a special fondness for it and interest in its future.

I am very glad to note that the General Dynamics' Chairman and CEO, Stanley Pace, is scheduled to give testimony here today. While we may have differing viewpoints, he and I have engaged in a friendly and for me very informative dialogue on the subject of conversion and diversification. I know that he will have a very useful hands-on perspective for the committee.

Without in any way anticipating his testimony, I would just like to tell you what my perception is of EB's position on the basis of my many discussions with the company's management over the years. My perception of their management, of their position, is simply this:

One, submarines are highly specialized products for which there really is no counterpart in the civilian economy; two, the company is organized to produce this specialized product for only one customer—the U.S. Government; three, for the company to shift into commercial production of other products would require substantial restructuring involving a new and unfamiliar approach to marketing; and finally, four, because the cost of such restructuring would be so high, the results so uncertain, the company's policy in the event of a curtailment of government orders is presently simply to shrink its operation, lay off workers and "hunker down" until a new cycle of government procurement occurs.

I would be delighted if Mr. Pace tells you that my perception of General Dynamics' policy is outdated. I for one do think that while the "hunker down" policy may have worked during the cycles of the cold war, it could be sorely tested in the new era which we seem to be entering, when we hope the new conditions may be more permanent.

While there seems to be widespread agreement that submarines and undersea defenses will remain one of the most resilient staples of our force structure, I am under no illusion that even here some adjustments would be in order. I note that your committee has requested assessments from the DOD and the President with respect to spacing out the production rate of Trident submarines and with respect to the implications for the Trident program of a strategic arms limitation agreement.

Whatever the outcome of these assessments, the essential fact for this committee is that EB typifies a segment of the defense industrial base which is peculiarly resistant to adaption to peace-time use, and to the extent that segment may resort to a hunker-down, lay-off strategy, the burden of adjustment falls more heavily on the public sector, and that is why I lay before you my bill, S. 2097, the Defense Diversification and Adjustment Act.

I do not want to delay you with a detailed analysis, but some of the high points of the bill are as follows: it is a two-pronged approach, attempting first to foster and encourage planning on both the community and corporate level to minimize future disruptions, and then to provide adjustment assistance in the event disruptions occur. First, with respect to planning, the modest grant program for local communities, provided for by S. 2097, could do much to anticipate the kinds of problems we had to deal with on an ad hoc basis in Rhode Island, following the disaster, to us, of the Navy's withdrawal in 1973. The advance notification provisions in the bill could set planning in motion before the blow hits. That would have helped us immeasurably in the experience we went through those 17 years ago.

With respect to corporate planning, S. 2097 lays a very modest requirement on large defense contractors to establish an internal planning facility that would hopefully envision alternative futures in a nondefense setting. Small businesses would be exempt.

While I do not expect this provision to be embraced by the contracting community, I do think it is a concept which should be thoughtfully considered. Frankly, I want to be sure that all the alternatives have been systematically weighed before we shoulder the high public costs of layoffs in the submarine industry. I want to

be sure that every consideration is being given to maintaining production at Electric Boat, with its unique capabilities for metal fabrication, whether that production involves undersea tankers or space vehicles or subway conduits.

And I would just observe that while we are concerned at the local level about preserving continuity of economic activity, the larger purpose of any legislation in this field should be to preserve important segments of the defense industrial base, and not allow them to go to seed.

Now with respect to essential adjustment assistance, I believe the aid for displaced defense workers contemplated by S. 2097 is consistent with aid extended to other classes of workers who are the victims of circumstances beyond their control. The retraining provisions are specifically equated to those provided for workers displaced by trade practices under the Omnibus Trade and Competitiveness Act of 1988.

This bill may be charting new territory in its provision to maintain health insurance coverage for displaced workers for 2 years. But it seems to me that it is a logical extension of the widening concern about health care costs. And it may well offer a cost-effective alternative to the public burden which can result if such workers have no health insurance coverage.

And then with respect to the financing provisions, I make no apologies for the fact that the bill does lay claim to a modest portion of the so-called peace dividend. It seems unarguable to me that some of the costs of adjustment should be met from the savings resulting from a curtailed defense budget.

But I would note that this suggests the transitory nature of these remedies; we are talking about short-term adjustments to be financed by relatively short-term savings. The remedies in my bill have a finite life and could be limited by a sunset provision, perhaps by the mid-1990s.

The bill also provides that a portion of the costs should be met by contractors themselves. I realize that this too is not a concept that would meet with much favor in the contracting community, but it seems to me that there is an argument to be made that the beneficiaries of the procurement system have an obligation to help in a minimal way to maintain the stability of the economy.

Having said this, I would acknowledge that the process of diversification can be a high-cost process that may require a significant infusion of capital. In recognition of this fact, consideration should be given to providing tax advantages to companies who present valid programs for diversification.

Finally, Mr. Chairman, I return to the thought that the small State of Rhode Island can be a very useful microcosm of the national problem you are considering. I do not want to leave you with the impression that S. 2097 was written with only one company or one set of problems in mind.

At the high end of the spectrum of adaptability we have a cluster of small engineering and computer firms which provide subcontracted services for the Navy. They are already feeling the squeeze of reduced defense spending. But they have skills and capabilities which appear to be readily transferable to non-defense activity.

But one problem they have encountered is difficulty in responding to bids from other government departments because of specifications tailored to existing suppliers. A remedy might be to assure equal footing for such firms as they attempt to broaden their marketing base.

I would note in closing two major Rhode Island contractors who occupy midway positions on the spectrum. Raytheon's Submarine Signal Division, employing some 3,000 people at Portsmouth, Rhode Island, is already engaging in creative marketing by seeking to expand its sales overseas. One such venture is pending at this moment, and I would only note that it has raised questions about assuring the use of foreign military sales funds to buy goods and services in the United States.

And the record would not be complete without noting that my State is home for the corporate headquarters of Textron, which to my mind is the model of a balanced conglomerate. Textron's policy of strategic diversity, started as a hedge against the cycles of the textile industry, now serve it well at this time when only half of its revenues are defense oriented, and they may go down.

In conclusion, I would hope the committee would report a bill which addresses the problem of economic adjustment to the new era in world affairs. I hope that S. 2097 could provide a framework upon which such a bill could be developed.

And I congratulate and thank you for undertaking a task which I believe is of paramount importance to our adjustment to a changing world. It is a problem that I, for one, have organized hearings and have been working on for some years, and I am so glad it is being looked at by you, sir.

[The prepared statement of Senator Pell follows:]

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Testimony by Senator Claiborne Pell

Mr. Chairman, members of the Committee, I appreciate very much having this opportunity to appear before you today and I congratulate you for your initiative in examining the problems facing our defense industries as they adjust to a changing world order that will deemphasize their role.

In my view, the management of this adjustment is the first order of business in the post Cold War world. It would be ironic indeed if we were to unable to manage the readjustment of the magnificent defense industrial base which played such an important role in bringing us to the position we now find ourselves in.

Moreover, it seems to me that no rational and orderly reduction in defense spending can survive the political process unless there is some system of adjustment in place to protect the interests of the people involved.

You begin today the difficult task of sorting out fact from fiction and relating past experience to future expectations. Without in any way wishing to prejudge either the problem or the solution, I do want to lay on the record today the background and reasoning behind the legislation which I have introduced and which is pending before this committee, S.2097, the Defense Diversification and Adjustment Act of 1990.

The bill was prompted, of course, by the perceived needs and interests of my constituents. But I would like to suggest that you may find the small state of Rhode Island to be a useful microcosm of the national problem which you are addressing.

There are a number of reasons why this is so, but the first is that Rhode Island is all too familiar with the harsh reality of a defense shutdown. We have been through one in the aftermath of Vietnam, and we know all too well that recovery doesn't occur overnight. That is why many people in my state want to see a Federal adjustment program in place without delay.

April 13, 1973, is still remembered as "Black Thursday" by many Rhode Islanders. On that day the Department of Defense abruptly announced it was pulling the Sixth Fleet out of Newport, decommissioning the Quonset Point Naval Air Station and curtailing other Navy activity in the state.

Thousands of people were thrown out of work, with serious reverberations for the rest of the economy. Of the nearly 36,000 people employed by the Navy in both military and civilian capacities in 1972, only 6,211 were counted four years later.

I am pleased to be able to report that the damage has long since been repaired, and that Rhode Island regained its economic equilibrium. But it took a substantial amount of goverment intervention to achieve that result, and all of us would like to be spared the trauma of being caught unprepared in the event history should repeat itself.

One of the keys to the recovery was the creative use of land and facilities declared surplus by the Navy. I am proud to have played a part in the Federal activity which helped to bring this about, including funding from the Economic Development Administration and long and difficult negotiations between the Navy and the General Services Administration.

As a result, the Navy's deep water piers adjacent to the Newport Navy Base became the home of the Derecktor Shipyard, a bustling enterprise employing as many as 800 people who build Coast Guard cutters, Army tug boats, and numerous other vessels and do subtantial maintenance work for the Navy.

Across the bay, the Quonset Point facility became an all-purpose industrial park under state auspices, providing employment for some 7,000 people, again as a result of intense negotiations with the GSA. And this brings us full circle, as it were, to the subject of these hearings. For the largest Pheonix to rise from the ashes of the Navy at Quonset Point was a new production facility for General Dynamics' Electric Boat Division, builder of nuclear submarines -- notably the Trident ballistic missile submarines and now the Seawolf attack submarines.

Electric Boat employs some 6,000 people at Quonset Point today, and another 3,000 Rhode Islanders work at Electric Boat's Connecticut plant at Groton, making the company the largest private sector employer of Rhode Island workers. The company makes a great contribution to the state's economy and we have a special interest in its future.

I am delighted to note that General Dynamics' chairman, Stanley Pace, is scheduled to give testimony here today. He and I have engaged in a friendly and, for me, very informative, dialogue on the subject of conversion and diversification, and I know that he will have useful perspective for the committee.

Without in any way anticipating his testimony today, I would just like to tell you what my perception is of Electric Boat's position, on the basis of my many discussions with the company's management over the years. My perception of their position is simply this:

-- Submarines are highly specialized products for which there is no counterpart need in the civilian economy.
-- The company is organized to produce this specialized product for one customer, the U.S. government.
-- For the company to shift into commercial production of other products would require a substantial restructuring, involving a new and unfamiliar approach to marketing.
-- Because the costs of such a restructuring would be so high, and the results so uncertain, the company's policy in the event of a curtailment of government orders is simply to shrink its operations, lay off workers and "hunker down" until a new cycle of government procurement occurs.

I will be delighted if Mr. Pace tells you that my perception of General Dynamics policy is outdated. I for one do think that while the "hunker down" policy may have worked during the cycles of the Cold War, it could be sorely tested in the new era which we seem to be entering.

While there seems to be widespread agreement that submarines and undersea defenses will remain one of the most resilient staples of our force structure, I am under no illusion that even here some adjustments may be in order. I note that this committee has requested assessments from the Department of Defense and the President with respect to spacing out the production rate of Trident submarines and with respect to the implications for the Trident program of a Stratetgic Arms Limitation agreement.

Whatever the outcome of these assessments, the essential fact for this committee to consider is that Electric Boat typifies a segment of the defense industrial base which is pecularly resistent to adaptation to peacetime use. And to the extent that

segment must resort to a hunker down and lay-off strategy, the burden of adjustment falls more heavily on the public sector.

And that is why I lay before you S.2907, the Defense Diversification and Adjustment Act. I will not burden this testimony with a detailed analysis, but I do want to explain some of the high points.

The bill has a two-pronged approach: it attempts to foster and encourage planning at both the community and corporate level to minimize future disruptions, and it provides essential assistance in the event disruptions occur.

First with respect to planning: The modest grant program for local communities provided by S. 2097 could do much to anticipate the kind of problems we had to deal with on an ad hoc basis in Rhode Island following the calamity of the Navy's withdrawel in 1973. The advance notification provisons of the bill could set planning in motion before the blow hits.

With respect to corporate planning, S. 2097 lays a very modest requirement on large defense contractors to establish an internal planning facility that would try to envision alternative futures in a non-defense setting. Small businesses would be exempt.

While I do not expect this provision to be embraced by the contracting community, I do think it is a concept which should be thoughtfully considered. Frankly, I want to be sure that all the alternatives have been systematically weighed before we shoulder the high public costs of layoffs in the submarine industry, for example. I want to be sure that every consideration has been given to maintaining production at Electric Boat, with its unique capabilities for metal fabrication -- whether that production involves undersea tankers or space vehicles or subway conduits.

And I would just observe that while we are concerned at the local level about preserving continuity of economic activity, the larger purpose of any legislative in this field should be to preserve important segments of the defense industrial base, and not allow it to go to seed.

Now with respect to essential adjustment assistance, I believe the aid for displaced defense workers contemplated by S.2097 is consistent with aid extended to other classes of workers who are the victims of circumstances beyond their control. The retraining provisions, for example, are specifically equated to those provided for workers displaced by trade practices under the Omnibus Trade and Competitiveness Act of 1988.

The bill may be charting new territory in its provision to maintain health insurance coverage for displaced workers for two years, but it seems to me that this is a logical extension of the widening concern about health care costs, and that it may well offer a cost-effective alternative to the public burden which may result if such workers have no health insurance coverage.

Lastly, with respect to the financing provisions of S. 2097, I make no apology for the fact that the bill lays claim to a portion of the Peace Dividend. It seems unarguable to me that some of the costs of adjustment should be met from the savings resulting from a curtailed defense budget. But I might also note that this suggests the transitory nature of these remedies; we are talking about relatively short term adjustments to be financed by relatively short terms savings. The remedies in my bill have a finite life and could be limited by a sunset provision, perhaps by the mid-1990's.

The bill also provides that a portion of the costs should be met by contractors themselves, particularly those most resistant to adaptability who have passed on the greatest burden of adjustment to the public sector. I realize that this too is not a concept that will meet with favor in the contracting community. But it seems to me that there is an argument to be made that the beneficiaries of the procurement system have an obligation to help in a minimal way to maintain the stability of the economy.

Having said this, I would aknowledge that the process of diversification, where it can occur, can be a high-cost process that may require a significant infusion of capital. In recognition of this fact, consideration should be given to providing tax advantages to companies who present valid programs for diversification.

Finally, Mr. Chairman, I return to the thought that the small state of Rhode Island can be a useful microcosm of the national problem you are considering. I do not want to leave you with the impression that S. 2097 was written with only one company and one set of problems in mind.

It is true of course, that on a spectrum of adaptability to a peacetime environment, Electric Boat ranks low because of its inflexibility for all the reasons I have noted. But we have a host of other contractors who rank all the way along the spectrum and who may be effected by the provisions of S. 2097 or who may need some other form of legislative assistance.

At the high end of the spectrum of adaptability we have a cluster of small engineering and computer firms which provide subcontracted services to major contractors and to the Navy. They are already feeling the squeeze of reduced defense spending. But they have skills and capabilities which appear to be readily transferrable to non-defense activity.

One problem they have encountered is difficulty in responding to bids from other government departments because of specifications taylored to existing suppliers. Possibly a remedy might be in order to assure equal footing for such firms as they attempt to broaden their marketing base toother government agencies.

I would note, in closing two major Rhode Island contractors who occupy midway positions on the spectrum. Raytheon Corporation's Submarine Signal Division, employing some 3,000 people at Portsmouth, R.I., is already engaging in some creative marketing by trying to expand its sales overseas. One such venture is pending at the moment, and I would only note that it has raised questions about assuring the use of Foreign Military Sales funds to buy goods and services in the United States.

And the record would not be complete without noting the Rhode Island is home for the corporate headquarters of Textron Corporation, which to my mind is the model of a balanced conglomerate. Textron's policy of strategic diversity, started as a hedge against the cycles of the textile industry, serve it well at this time when only about half its revenues are defense related.

In conclusion, Mr. Chairman, I urge this committee to report a bill which addresses the problem of economic adjustment to a new era in world affairs. I hope that S. 2097 can provide a framework upon which such a bill can be developed. Again, I congratulate you for undertaking a task which I believe is of paramount importance to our national adjustment to a changing world.

Senator BINGAMAN. Thank you very much, Senator Pell. I do think your legislation raises some very constructive proposals that we need to seriously consider as we go ahead with our defense authorization bill this year. And we appreciate your explanation of those and your explanation of the context in which those were drafted.

Thank you very much. We will allow you to go on to your other committee duties at this point, and call our first panel.

Senator PELL. Thank you. And thank you for your patience.

Senator BINGAMAN. Thank you.

Would Dr. Gansler and Dr. Gordon Adams and Professor Seymour Melman please come forward? Why don't we start with Jack Gansler, then Dr. Melman, and then Dr. Adams, in that order.

## STATEMENT OF DR. JACQUES S. GANSLER, SENIOR VICE PRESIDENT, THE ANALYTICAL SCIENCES CORPORATION (TASC)

Dr. GANSLER. Mr. Chairman, Senator Riegle, let me comment first, I did submit a formal text, and I hope that could be put into the record, and I will just summarize.

Senator BINGAMAN. Yes, that is fine. And let me just say to all witnesses, we would prefer if you could summarize your statement in 8 or 10 minutes, and we will include any written statements that any of you have in full in the record.

Please, go ahead.

Dr. GANSLER. In my opinion, the legislative requirement for corporate conversion planning will not achieve the desired objective. Rather, it will simply further raise the cost of defense equipment, further contribute to the increasing inefficiency in the industry, and perversely, likely result in a greater separation of the civil and military sectors of the U.S. industrial base, which is of course exactly the opposite of what is needed.

Instead, I believe a longer-range effort is required to remove the current barriers that exist to integration of the civil and military sectors, in fact, barriers that have been increasingly created by legislative and executive branches over the last few years.

With these disincentives removed, and hopefully, incentives created, any competitive U.S. defense firm will on their own initiative have the obvious corporate incentives necessary to devote significant resources, as are required, to planning for an effective shift from a declining defense market to a growing high technology civilian market.

The lessons to be learned from history in the area of plant conversion clearly indicate that quick fixes have been extremely unsuccessful. After World War II there was an incredible pent-up demand for commercial products that allowed a relatively rapid conversion. However, that demand does not exist today.

Other periods of significant defense cutbacks, such as the post-Vietnam era, indicate that conversion has been very difficult, very long, and usually unsuccessful. Today conditions are such as to make it even more difficult.

Specifically, the overall U.S. economy is at best sluggish, the U.S. industry is losing its international competitive lead in many critical industry sectors, and in the defense arena itself, current gov-

ernment procurement practices have been forcing a continued separation within corporations of their military and civil sectors, thus making conversion that much more difficult.

Nonetheless, having said that, it is still absolutely essential that the United States begin now to take steps to address both the dual problems of a declining international competitiveness and its deteriorating defense industrial base. The opportunity for such actions may only last a couple of years. Most forecasts of the defense cutbacks indicate a relatively shallow decline for the first few years, with an increasing cutback as world conditions begin to stabilize, and if they stabilize in a peaceful manner.

Additionally, the rapidly declining relative U.S. technological world leadership position demands, in my opinion, immediate action, before it is too late to ever catch up again. Thus, clearly, the time for action is now.

And yet, the hardest thing for the United States to accept is that traditional U.S. policy paradigms have lost their relevance. Let me just note a few of those.

I believe we can no longer assume that economic and security issues can be treated separately. We can no longer assume a self-contained defense industry. We can no longer assume that government is not involved in international industrial competitiveness. We can no longer assume a U.S. technological leadership in all military relevant technologies. We can no longer assume an available U.S. skilled labor force without action. We can no longer assume that what is in a U.S. corporation's interest is necessarily in the Nation's interest. And finally, we can no longer assume that critical defense technology is different than critical civilian technology, for example, areas such as advanced electronics, new structural materials, supercomputers, advanced manufacturing equipment, et cetera, are all critical to both sectors.

So, therefore, new national policies, based on a recognition of the changed realities, are clearly required.

This subcommittee's efforts, particularly your emphasis on identification of critical technologies, I believe are extremely positive steps toward having these important changes gain greater recognition. Hopefully they will result in revised U.S. policies toward being consistent with the needs of today's realities. In fact, to use public policy to help rather than to continue to retard America's industrial competitiveness.

The purpose of the needed government action should be to allow and encourage U.S. firms to achieve the rapid market adjustments required for today's changes in technology, management, and international forces. A place to start is with the defense industrial base, because clearly this is an area in which the Government is totally involved, and must remain so. In my prepared remarks I point out how that is the case.

The problem is that the Nation has a de facto defense industrial strategy that is not coherent and is often counterproductive. It is implemented through its day-to-day actions. The results, as you, Mr. Chairman, recently stated, are that, "The signs of deterioration of the defense industrial base are all around us." Again, in my prepared remarks I present a long list of those deteriorations.

The fact that many of these problems appear to have worsened and not improved during the past decade of high defense spending poses a real paradox for those who argue that increased spending can cure the structural problems or that the market will provide solutions. As future defense spending declines, we can be sure that these problems will grow even worse unless we take actions now to address them.

Perhaps of greatest concern is the rapid loss of U.S. leadership in critical defense technologies—both product (for weapons) and process (for manufacturing) technologies. That has already been taking place and is projected to get worse over the coming years. The high cost, high risk, and long time period that will be involved in reversing this technological leadership trend make it essential that it be addressed through a joint public-private sector effort.

As Defense Secretary Cheney recently wrote, "the United States cannot persist in its current laissez-faire approach to the competition in advanced technologies without incurring major economic and security problems of its own in the future."

To respond to this concern I believe it is necessary to agree on a clear vision of the structure of the defense industry that we are trying to achieve as we enter the 21st century and then to initiate a consistent set of government and industry actions to move us there during the decade of the 1990s.

The vision that I would propose is one in which the U.S. defense industry is no longer a unique sector, but a largely indistinguishable part of an overall U.S. industrial base, one that would develop and produce goods for both civil and military needs and would do this wherever practical in common integrated factories.

However, today, unique military buying practices, cost accounting standards, regulations, specifications, et cetera, all retard and in some cases legally prohibit such military-civil integration. Clearly this defense uniqueness must be stopped. It is no longer affordable and today's technology does not require it.

Once integration can be achieved, wherever it is applicable, and there will clearly be some places where it will not, then not only will the DOD gain from the cost and quality and delivery of superior commercial parts and equipment, but overall U.S. industrial competitiveness will be enhance by the dual use application of the large annual defense R&D and capital equipment investments. And particularly important, we will gain maximum effective utilization of the skilled U.S. labor work force.

Finally, based upon defense needs, highly selected critical technologies can be nurtured sufficiently to be able to build up a domestic engineering and manufacturing base both to satisfy the military's needs and to strengthen our economic security and our national competitiveness.

To implement this future vision of the U.S. defense industrial base, the Department of Defense as the primary buyer, must acknowledge its responsibility for the health, innovativeness, responsiveness and domestic viability of the industry, and it must take the lead in a government-wide effort with strong congressional support. In my prepared remarks I have a few pages of specific recommendations on a four-part action plan to do that.

Obviously the Nation's overall competitiveness problem cannot be solved solely by addressing the defense industry, but it is a place to start, and no one can argue that the Government does have a role here. Whether it is the proposed action plan that I suggested or some other one, it is clearly time to recognize the changing international economic and geopolitical environment and begin to take actions.

In summary, the achievement of a vision for the future defense industrial base such as the one I described will clearly take many years, and it will require continuous leadership. This hearing and future legislation that can result from it can be important steps in achieving the needed changes that the Nation must undertake to reverse the disastrous dual trends of a deteriorating defense industrial base and of a declining U.S. industrial competitiveness.

The committee is to be commended for its initiative. Our future military and economic security depend upon the continuation of such steps. Thank you.

[The prepared statement of Dr. Gansler follows:]

## Strengthening The Defense Industrial Base

Jacques S. Gansler*

With "peace" breaking out and a continuing decline in the defense budget projected, many are frantically running around searching for "quick fixes" that will allow successful conversion of defense plants into competitive commercial producers. Unfortunately, the lessons to be learned from history in this area are not very positive. After World War II, there was an incredible pent up demand for commercial products that allowed a relatively rapid conversion. However, that demand does not exist today and other periods of significant defense cutbacks -- such as the post-Viet Nam era -- indicate that such conversion has been difficult, long, and usually unsuccessful. Today, conditions are such as to make it even more difficult: the overall U.S. economy is, at best, "sluggish"; U.S. industry is losing its international competitive lead in many critical sectors; and, in the defense arena, government procurement practices over the last few years have forced a further separation of the military and civilian sectors (thus, making conversion that much more difficult).

Nonetheless, it is absolutely essential that the U.S. begin now to take steps to address the dual problems of its declining international competitiveness and its deteriorating defense industrial base. The opportunity for such actions may only last for a couple of years. Most forecasts of the defense cutbacks indicate a relatively shallowed decline for the first few years with an increasing cutback as world conditions begin to stabilize -- and if they stabilize in a peaceful manner. Additionally, the rapidly declining relative U.S. technological world leadership position demands immediate action -- before it is too late to ever catch up again. Thus, the time for action is now.

Clearly, we are living in a rapidly changing world. Many of these changes impact directly on U.S. security and competitiveness. To be in a strong position in the future, we must recognize and adjust to the changes -- not simply be content with our current status. Consider four critical changes and their effects:

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- The changing U.S./Soviet relations and changes in Eastern Europe lead to a reduced defense budget and the need for a restructured defense program,

- The growing drug war and 3rd-World "hi-tech" military capabilities lead to a shift in how our national security resources are spent,

- Globalization of technology, industry, and finance lead to changes in trade and technology transfer policies, and

- The growing economic and technological power of Japan and the European community raise the issue of "economic security" as a critical element of "national security."

The hardest thing for the U.S. to accept is that traditional U.S. policy paradigms have lost their relevance. For example:

- We can no longer assume that economic and security issues can be separately treated.

- We can no longer assume a self-contained defense industry.

- We can no longer assume that government is not involved in international industrial competitiveness.

- We can no longer assume a U.S. technological leadership in military-relevant technologies.

- We can no longer assume an available U.S. skilled labor force.

- We can no longer assume that what is in a U.S. corporation's interest is necessarily in the nation's interest.

- Finally, we can no longer assume that critical defense technology is different than critical civilian technology -- areas such as advanced electronics, new structural materials, supercomputers, advanced manufacturing equipment, etc. are critical to both.

New national policies, based on a recognition of the changed realities, are required. The objectives must be to assure that in areas such as trade policy, tax policy, education, financial markets, government R&D investments, defense procurement

practices, and the many other ways in which government affects industry "structure, conduct and performance," the U.S. takes actions which allow, and even incentivize, market operations that will achieve results that strengthen both our nation's security and our national industrial competitiveness. Unfortunately, today that is not the case. Current U.S. government policies actually result in: high costs of capital, poor education of our future workers, short-term investment incentives, uncompetitive international trade practices, high cost and low quality goods (especially in defense-related products), and a general government/industry relationship which has the two sides in constant opposition -- rather than working together toward a common set of long-term national goals.

As long as we were the undisputed economic and military leader of the world we could afford to essentially ignore the coming realities. But today the economic, military, and political changes around the world can no longer be ignored. This Subcommittee's efforts -- such as your emphasis on development of "critical technologies" are extremely positive steps towards having these important changes gain greater recognition. Hopefully, they will result in revised U.S. policies -- toward being consistent with the needs of today's realities; to use public policy to help -- rather than continue to retard -- America's industrial competitiveness.

The purpose of the needed government action should be to allow, and encourage, U.S. firms to achieve the rapid market adjustments required for today's changes in technology, management, and international forces. A place to start is with the defense industrial base -- an area in which, clearly, the government is totally involved, and must remain so. Here, one cannot argue any of the classic "myths of the market." For example:

- We cannot state that "the free market will achieve economic efficiency;" since, with a single buyer, and usually only one supplier of an individual weapon system, there are no market incentives to achieve the needed efficiency. Historical data, showing high and rising costs with inadequate quality, is evidence of the failure of this myth.

- Similarly, to state that "we will not have a defense industrial policy" is again to ignore reality, since the government is already totally involved in the defense

industry (as the buyer, the banker, the specifier, the regulator, the user, and even the Court of Claims). Thus, its daily actions establish its industrial policy -- whether good or bad.

- Finally, one cannot argue that "we will not pick winners and losers," when the DoD spends over $35B a year on research and development, by definition "picking" some areas and giving less attention to other areas -- thus clearly determining which technologies will be sponsored and which ones will not.

The problem is that the nation has a de facto defense industrial strategy that is not coherent and is often counter-productive. The results, as you, Mr. Chairman (Senator Bingaman) recently stated, are that "the signs of deterioration of the defense industrial base are all around us." These include:

- Rapidly rising military equipment costs
- Inadequate quality of products produced
- Lack of surge capability (for increased production)
- Increasing lead times (for new products)
- Excess capacity at the prime contractor level
- Heavy debt structure
- Lack of parts suppliers
- Lack of cost-reducing capital investments
- Growing dependence on offshore purchases of parts
- Growing dependence on foreign sales of equipment
- Increasing foreign ownership of domestic plants
- Difficulty of getting a skilled work force
- Difficulty of getting U.S. graduate engineers
- Almost total separation of most firms' military and civil operations (due to the low efficiency in defense)

The fact that many of these problems appear to have worsened -- not improved -- during the past decade of high defense spending levels poses a real paradox for those who argue that increased spending can cure the structural problems -- or that "the market" will provide solutions. And, as future defense spending declines, we can be sure that these problems will grown even worse, unless we take actions now to address them.

Perhaps of greatest future concern is the rapid loss of U.S. leadership in critical defense technologies -- both product (weapon) and process (manufacturing) technologies -- that has

either already taken place or is projected over the coming years. The high cost, high risk, and long time period that will be involved in reversing this technology leadership trend make it essential that it be addressed through a "joint public-private sector" effort. As Defense Secretary Cheney wrote in the 1989 edition of "Soviet Military Power" (page 133):

> "In the years ahead, the United States will confront new challenges, perhaps from a revitalized and restructured Soviet economy, but almost certainly from a unified and competitive Europe, a dynamic Japanese economy, rapidly developing countries like South Korea and Singapore ... [all having] implications for the US techno-industrial base and, by extension, the military balance. . . . [as a consequence] the United States cannot persist in its current laissez-faire approach to the competition in advanced technologies without incurring major economic and security problems of its own in the future." [emphasis added]

To respond to this concern, it is necessary to agree on a clear "vision" of the structure of the defense industry that we will require as we enter the 21st century, and then to initiate a consistent set of government and industry actions to move us there during the decade of the 1990s. The "vision" I would propose is one in which the U.S. defense industry is no longer a "unique" sector, but a largely indistinguishable part of an overall U.S. industrial base -- one that would produce goods for both civil and military needs; and would do this (wherever practical) in common (integrated) factories. Ruggedized, commercial equipment (in areas such as electronics) today is often lower in cost, higher in quality, and more advanced in performance -- for the same environments -- than equivalent military equipment. Additionally, modern, automated, "flexible manufacturing" factory operations allow multiple products to be produced efficiently in the same plants (thus allowing great economies of scale in peacetime, and rapid conversion -- in order to increase military production -- should world conditions demand it). However, unique military buying practices, cost accounting, regulations, specifications, standards, etc. all retard -- or even prohibit -- such military-civil integration. Clearly, this "defense uniqueness" must be stopped! It is no longer affordable, and today's technology does not require it.

Once integration can be achieved (wherever applicable -- and there will clearly be some places where it won't apply), then not only will the DoD gain from the cost, quality, and delivery of superior commercial parts and equipment, but overall U.S. industrial competitiveness will be enhanced by the "dual use" applicability of the large, annual Department of Defense R&D and capital equipment investments, as well as the maximum effective utilization of the skilled U.S. labor force. Finally, based on defense needs, highly-selected critical technologies can be nurtured sufficiently to be able to build up a domestic engineering and manufacturing base -- both to satisfy the military's needs and to strengthen our economic security and international industrial competitiveness.

To implement this future "vision" of the U.S. defense industrial base, the DoD -- as the primary defense buyer -- must acknowledge its responsibility for the health, innovativeness, responsiveness, and domestic viability of the industry, and it must take the lead in a government-wide, four-part action plan to: first, reverse the many harmful defense procurement steps taken in recent years (e.g., reduced profits, reduced cash flow, cost sharing on high-risk R&D, and excessive intrusion in contractor operations); second, create an overall "environment" to improve U.S. international competitiveness (addressing: antitrust, capital markets, trade, R&D and capital investment incentives, and -- especially -- education); third, encourage a dramatic restructuring of the defense industry by removing the barriers to civil/military integration (from unique military specifications and thousands of special regulations, through special cost accounting and data rights); and, fourth, select a few "critical defense technology sectors" of the U.S. economy and -- with industry leadership -- take actions to revitalize these sectors (e.g., with R&D investments, guaranteed purchases, consortia, etc.). It is important to emphasize that most of these critical sectors would be at the lower tiers of the defense industry (the materials, parts, and manufacturing process levels), and they are likely to be "dual use" industries -- thus, also helping U.S. industrial competitiveness.

A key point to make is that these four sets of actions must fit into an integrated plan. All four are required. For example, individual government investments without an overall "environment" change would not work (since there would be insufficient industry incentives to build on the original investment); nor would shifting to buying commercial components without domestic R&D

incentives (it would simply shift more procurement offshore); nor would defense funding of R&D without consideration of potential commercial needs (it would only result in more "specialized, high-cost, military" parts). Fortunately, since critical defense technology areas today greatly overlap with the essential needs of the civilian economy (e.g., advanced semiconductors, new structural materials, software productivity, advanced production equipment, and telecommunications) the actions taken for defense reasons can dramatically improve U.S. industrial competitiveness in the civil sector -- but only if we take these actions with a dual-use objective explicitly in mind. For example, if, in developing advanced, defense computing and display systems, the Department of Defense does not use specialized military specifications, unique DoD standards, etc.; but, instead, uses commercial components, commercial specifications and standards, and -- most important -- commercial buying practices.

Obviously, the nation's overall competitiveness problems cannot be solved solely by addressing the defense industry -- but it is a place to start; and no one can argue that the government does not have a role there. Whether it is the above-noted four-part set of long-term actions, or some other, it is clearly time to recognize the changing international economic and geopolitical environment and to begin to take action. To quote again from Secretary Cheney's September 1989 report ("Soviet Military Power: Prospects for Change"):

> "If the United States proves unable to compete effectively in areas of advanced technologies, it would incur the most severe economic and security consequences: markets would be lost, the U.S. industrial base would erode, and the United States would become increasingly dependent upon offshore technologies for its defense at the same time as its economic health weakens. It is somewhat ironic that, although the Soviet Union constitutes the greatest threat to U.S. security, the greatest challenge to the U.S. technology and industrial base will almost certainly come from the United States' own allies. Thus the United States must succeed in this "friendly competition" with advanced Western industrial states if its economic power, and the West's system of collective security, is to endure."

Recently, Senator John McCain raised a critical question when he stated: "As it becomes recognized that the U.S. government is significantly involved in the issue of national competitiveness, who is going to take the responsibility?" Today there is -- unfortunately -- no obvious answer. It is clear, however, that the answer must go well beyond the establishment and implementation of a "defense technology strategy". Yet, the latter must fit into this overall picture and it can be an essential first step.

The achievement of a "vision" for the future defense industrial base (such as that described above) will clearly take many years -- and will require continuous leadership. This hearing -- and future legislation that can result from it -- can be important steps in achieving the needed changes that the nation must undertake to reverse the disastrous dual trends of a deteriorating defense industrial base and of a declining U.S. industrial competitiveness. The Committee is to be commended for its initiative. Our future military and economic security depend upon the continuation of such steps.

Senator BINGAMAN. Thank you very much. We appreciate your testimony, and we will have some questions after we hear from the other two panelists.

Dr. Melman, why don't you go ahead?

**STATEMENT OF DR. SEYMOUR MELMAN, CHAIR, NATIONAL COMMISSION FOR ECONOMIC CONVERSION AND DISARMAMENT; ACCOMPANIED BY JONATHAN FELDMAN, PROGRAM DIRECTOR, NATIONAL COMMISSION FOR ECONOMIC CONVERSION AND DISARMAMENT; AND ROBERT KRINSKY, PROGRAM DIRECTOR, NATIONAL COMMISSION FOR ECONOMIC CONVERSION AND DISARMAMENT**

Dr. MELMAN. I am pleased to be here representing the National Commission for Economic Conversion and Disarmament. Joining me at this time are Jonathan Feldman and Robert Krinsky, Program Directors of the National Commission for Economic Conversion and Disarmament, and they will be pleased to be available for questions concerning matters of a peace dividend, economic conversion and disarmament: central topics that this testimony will touch upon.

I will touch on six principal points. First, the peace dividend. No arcane research is required to discover the condition of deterioration and decay in the public facilities and the conditions of public life, notably in our great cities, but elsewhere as well. Broken streets, poor transportation facilities, incompetent water works, bad waste disposal, a castoff population lost on the streets. We have developed a condition which writers in various journals now term Calcutta, USA. It is not an exaggeration. It is a description of new conditions of American life.

I live on Broadway in New York City near Columbia University. There are more beggars on Broadway today than could be found during the great depression. I saw the great depression, and I see the present decay in the life of New York City. The deterioration of infrastructure and of competence and production gives rise to the need for a peace dividend.

Second, what is the magnitude of a peace dividend? The National Commission has prepared a set of estimates which I submit for the record. We have termed this a Save America Budget. The Save America Budget is a partial estimate of the annual requirements for repairing housing, for cleaning radioactive waste, for repairing roads, bridges, water works, sewers, for making modest improvements in health care, for beginning to improve the dreadful condition of educational facilities and the quality of instruction, et cetera.

# PART 1: THE SAVE AMERICA BUDGET:

**Estimated Annual Federal Outlays Needed for Selected Public Works and Services**

**Environmental Repair**

**$17.5 billion**—First year of a ten-year program for cleaning up radioactive waste and Atomic Bomb plants.[1]
**$10.0 billion**—First year of a ten-year program for cleaning up toxic wastes costing $100 billion according to Office of Technological Assessment estimates.[2]
**$6 billion**—Annual cost to cut sulfur dioxide emissions by 8-12 million tons/year in the United States to combat acid rain.[3]

**Infrastructure**

**$26 billion**—The difference between needs and available revenues required for repair of roads, bridges, water and sewer systems from 1989 to 2000.[4]
**$10 billion**—First year of a ten year program costing $100 billion to prepare the nation's rail system for electric power propulsion.[5]

**Education**

**$30 billion**—One year of Department of Education spending for public education with a 50% increase in expenditures over and above current annual allocations by the federal government.[6]
**$10 billion**—Annual cost of a full preschool education entitlement, with adequate salaries for teaching staff.[7]
**$2.2 billion**—A restoration of President Bush's proposed cuts from the compensatory education program.[8]
**$4.4 billion**—An addition to the Head Start Program so that all eligible children could be served.[9]
**$1.0 billion**—To restore Bush's proposed cut of financial assistance to needy students.[10]
**$8.0 billion**—The first year of a ten year program to address deferred maintenance at colleges and universities.[11]
**$1.1 billion**—The first year cost of a two-year program to purchase 77,000 school buses needed, each costing $30,000.[12]

**Housing**

**$30 billion**—The annual cost of a comprehensive housing program to address the housing shortage and homelessness problem.[13]

**Health**

**$5.1 billion**—The annual cost of providing pre-natal care for the poorest mothers.[14]
**$.1 billion**—The first year cost of a five year program to construct waters and sewers for 100,000 residents along the Texas/Mexico border.[15]
**$1.0 billion**—Restoration of proposed Bush cuts in supplemental Social Security assistance for the blind, elderly and disabled.[16]
**$9.6 billion**—Restoration in the proposed Bush cut in Aid for Dependent Children.[17]
**$7.3 billion**—Cost of providing food stamps for persons eligible but not receiving such assistance.[18]

**Total Estimated Cost of A Save America Budget: $173.3 billion**

**NOTES: Calculations are derived from the following source material:**

1. *The New York Times*, January 6, 1989.
2. *The New York Times*, March 10, 1985.
3. Michael Renner, "Enhancing Global Security," in *State of the World: 1989*, (New York: W.W. Norton & Company, Inc., 1989).
4. U.S. Congress, Joint Economic Committee, *Hard Choices*, February 25, 1984.
5. Estimate prepared by Professor John E. Ullmann, Hofstra University, Hempstead, New York.
6. A. Bastian, N. Fruchter, C. Green, "Reconstructing Education," in M. Raskin, C. Hartman, eds., *Winning America*, (Boston: South End Press, 1988), p. 11.
7. Ibid., p. 204.
8. Center on Budget and Policy Priorities, "The Bush Budget," February 17, 1989, p. 10.
9. *The New York Times*, Editorial, October 18, 1987.
10. Center on Budget and Policy Priorities, op. cit., p. 10.
11. *The New York Times*, October 13, 1988.
12. *The New York Times*, March 29, 1989; National Transportation Safety Board.
13. C. Hartman, "Decent Affordable Housing for All," in *Winning America*, op. cit., p. 197.
14. *The New York Times*, Editorial, September 27, 1988.
15. *The New York Times*, December 3, 1988.
16. Center for Budget and Policy Priorities, op. cit., p. 5.
17. Idem.
18. *The New York Times*, March 23, 1988.

In New York City there are 1,000 public school buildings. Of these, 83 percent, 830, are marked as eligible for major repair and maintenance. That means broken windows, broken roofs, plumbing not working, children deprived of decent places for eating, for play. The public libraries of our Nation are a shambles. Seated here in these elegant quarters of the U.S. Senate I remind you that the Library of Congress quartered nearby was forced by budget restriction to reduce visitor hours and other services.

The Save America Budget amounts to $173 billion per year. That is a partial budget of annual requirements. Our estimate is that a full performance of works required to repair the infrastructure of the United States, and that full estimate would have to be made by the governments of cities, towns, counties, and States, would yield an aggregate requirement totaling more than $5 trillion of new repair activity.

It is important for this hearing that we appreciate the limits of the discussion on peace dividend. For this purpose I put into the record a historical and analytical peace titled "Claiming the Peace Dividend," by Jonathan Feldman, that appears in the New Economy of May 1990.

# Claiming the Peace Dividend

By Jonathan Feldman

## The Call for a Peace Dividend

Accross the country more and more voices are raised in support of spending the military budget on pressing domestic needs. Much of New York Governor Mario Cuomo's State of the State speech on January 3rd, 1990 was devoted to criticizing the Federal Government for reducing aid to the states. As the *New York Times* reported on January 4th, Cuomo "called on lawmakers of both parties to join him in lobbying Congress and the President to spend what he called the 'peace dividend'—the amount the country could save as a result of the thaw in the Cold War—on increased assistance to the states. 'Let's go down to Washington together to see all of them there,' the Governor said. 'Let them know we stand united.'"

Cuomo's call for spending the peace dividend on civilian programs was echoed by New York Mayor David Dinkins in a press conference at a U.S. Conference of Mayors gathering on January 25th. "It's time to demand that our national government attack the abuses of city life, instead of evading the emergency of urban America...Right now, as change sweeps the globe, challenging our commitment as a nation and our ingenuity as a people, we have the best chance in a generation to right the wrongs of our own society." Dinkins' push for investing the peace dividend in the cities was supported by Ray Flynn, Mayor of Boston, as well as other mayors who endorsed a peace dividend resolution at the January 25th meeting.

Dinkins, Cuomo and Flynn are supported by the majority of the American public. According to a *New York Times* poll published in January, three out of four citizens say they want the peace dividend to be spent to fight domestic problems rather than to cut taxes or close the budget deficit. But the Bush Administration plans to reduce the budget deficit by making cuts in domestic programs like housing, transportation and Medicare payments to hospitals and physicians. About half of the $36.5 billion in cuts would come from these sources; cutbacks in the military would produce only $6 billion, the balance coming from new revenue.

The peace dividend is now on the table because of large structural forces at work in the Soviet and American economies. The extension of unproductive military spending has led to large scale budget and trade deficits in both superpowers that drain resources from productive civilian investment. For the nation's mayors, the diversion of budgetary resources from the public sector has led to a systematic breakdown in basic services. New York City serves as an important case study. In New York City, 83 percent of schools are in disrepair and 14 bridges are at least partly closed for repairs. The city intends to produce 80,000 new apartments and houses by the mid-1990s. However, the city actually needs an estimated 150,000 additional units of housing; i.e. about twice as many housing units are needed as can be funded. What does this shortfall mean in dollar terms? From 1989 to 1998, the city's ten year capital plan would allocate about $5 billion for housing construction. However, a rough estimate of the funds needed to complete all needed housing would be $10 billion, leaving a capital funding gap of $5 billion.

The Bush Administration sees military cutbacks as a vehicle for financing budget deficits. But the Reagan Administration cut social programs to divide progressive constituencies. The military got first crack at budgetary resources. Environmental, housing and social welfare advocates were left to fight over a shrinking pie. The bureaucracies which supported civilian programs were also cut as a way of demobilizing progressive forces. Today, the Bush Administration appears to be between a rock and a hard place. Serious military budget cutbacks will alienate those invested in the military-industrial complex, a core constituency for the Republican Party. Raising taxes to pay for deficit reduction will alienate the Reagan Democrats. Spending the peace dividend on social programs will bolster progressive constituencies that will owe little allegiance to Bush or his followers. The Republican's solution was offered by Senator Phil Gramm: "the Republican agenda clearly should be in my opinion to put the money back in the hands of the people who won the Cold War: the American taxpayer." Gramm advocates a "perestroika tax cut," with tax reductions for child care and education and tax breaks for urban enterprise zones and research and development.

By spending the peace dividend on the budget deficit, Bush solidifies his support from financial interests and maintains the politics of scarcity that have divided the Left for the last decade. The key to breaking this deadlock is to support strategies that will release the peace dividend. How can new constituencies for the peace dividend be marshalled in support of disarmament and progressive foreign policy?

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*Jonathan Feldman is Program Director of ECD. This article originally appeared in expanded form in* Zeta Magazine, *March 1990.*

## Peace Dividend

### Forging the Peace Dividend Coalition

George McGovern and Jesse Jackson's candidacies for the presidency showed that large scale coalitions could be formed to support a strong anti-intervention stance and military budget reductions at the national level. The key to their success was twofold. First, they forged coalitions that involved the participation and enthusiasm of millions of citizens. Second, they were able to explain the connection between foreign and domestic policy issues. This past history and the Bush Administration's response to the peace dividend should point the way for the disarmament alternative.

The main obstacles to the peace dividend are institutional interests that promote military programs on a continuing basis and resist military program cutbacks. President Bush's budget leaves in place the most expensive weapons systems and would give the Air Force a nearly $2 billion increase in budget authority. "Getting big Defense budget cuts through Congress won't be easy ..." reports *The Wall Street Journal* of January 29th. "The Pentagon has always been clever to spread its programs around the country, touching virtually every congressional district." As budget chief Richard Darman warns, a program of cuts in the military, "while politically popular in the abstract, will not be politically popular in all its particulars."

### National Policies for the Peace Dividend

Twenty-six years ago policy-makers at the highest levels of the U.S. Government were actively engaged in the formulation of plans for general and complete disarmament. They focused on the need for mutually verifiable phased weapons reductions and the strengthening of international institutions for conflict resolution. In 1961, John J. McCloy, President Kennedy's special advisor on disarmament, and Valerian Zorin, Deputy Foreign Minister of the Soviet Union, reached accord on the Joint Statement of Agreed Principles for Disarmament negotiations. These discussions led to the development of an "Outline of Basic Provisions on General and Complete Disarmament," presented by the U.S. Government to the Eighteen Nation Disarmament Conference in Geneva in 1962. Today, a revised version of such comprehensive proposals has been drafted by Marcus Raskin, Co-Founder of the Institute for Policy Studies in his "Draft Treaty for a Comprehensive Program for Common Security and Disarmament." This treaty offers a concrete focal point for both political discussion and organized action in Congress.

Complementing the Raskin disarmament proposals are legislative plans for economic conversion. By readying military-serving firms, bases and laboratories for civilian production, conversion planning provides options for workers and their families who have been conscripted and employed in service of the military. A model conversion bill drafted by New York Congressman Ted Weiss (H.R. 101) now has 68 co-sponsors in the House of Representatives. The "Defense Economic Adjustment Act" provides funds for local planning, retraining of military laborers and engineers, income maintenance during a conversion and the creation of joint labor-management alternative use committees which oversee conversion at each facility receiving military contracts. House majority leader Richard Gephardt is strongly interested in putting together a legislative package on conversion and defense economic adjustment.

In addition to the Weiss Bill, economic alternatives are needed for the millions of armed forces personnel who face unemployment as they are demobilized after comprehensive disarmament. One proposal which seeks to provide alternatives for communities which have been forced into the armed forces by economic conscription is the "Future Corps" bill in the Massachusetts legislature, sponsored by Mark Roosevelt in the House of Representatives and Mel King, Boston Rainbow Coalition leader. Such proposals need to be supplemented by national legislation which would provide educational and employment opportunities for the millions now serving in the nation's armed forces.

For the anti-intervention movement there are alternatives to ad hoc protests and calls for simply cutting arms sales to repressive states. The disarmament of the warfare state's interventionary capacity requires a national movement which develops legal constraints on the use of force, budgetary reductions of institutions of covert action, and a popular awareness of the dangers of an interventionary and permanent warfare state to domestic liberties. Formal proposals in this direction include halving the C.I.A.'s budget, and Representative John Conyers "Official Accountability Act of 1987," which calls for legal sanctions against national security bureaucrats who violate any statute or Executive Order in force or international agreements to which the United States is a party.

### A National Town Meeting on the U.S. After the Cold War

Legislative proposals do not substitute for grassroots organizing and efforts to construct meaningful political coalitions. Yet, the political program advanced here defines the core of a solution to the destructive conse-

**Peace Dividend**

quences of militarism. Without conversion and economic alternatives for persons in the armed forces, disarmament efforts will be checkmated by communities locked into the military economy. Without a comprehensive disarmament treaty, conversion plans will be checkmated by claims that arms cuts mean weakness before other nations' conventional and nuclear arsenals. Without comprehensive conversion and disarmament planning, the proposals advanced by some for new "alternative security arangements" will lend themselves to a conventional arms build-up. Ad hoc protests against particular interventions leave in place the institutional actors which direct these interventions. In contrast, a comprehensive peace program provides a focal point for efforts to reduce military spending and redirect our resources to pressing needs for housing, mass transit, infrastructure and social investment.

Mobilization around the common agenda advocated here requires the rebirth of the participatory democracy forged in the McGovern and Jackson presidential campaigns. Such participation is essential to placing a progressive disarmament agenda at the head of national discussion. As Dwight MacDonald wrote in *The Responsibility of Peoples*, "It is a terrible fact, but it is a fact, that few people have the imagination or the moral sensitivity to get very excited about actions which they don't participate in themselves (and hence about which they feel no personal responsibility). The scale and complexity of modern Governmental organization, and the concentration of political power at the top, are such that the vast majority of people are excluded from participation."

To support a new participatory politics, the National Commission for Economic Conversion and Disarmament has joined forces with national and local organizations across the country to convene the first national town meeting on "The U.S. After the Cold War: Claiming the Peace Dividend."

It is also important to appreciate the role that the media have played in assessing the peace dividend, and the consequences of that discussion for the public understanding. For this purpose I call attention to an article by Robert Krinsky which I ask to be put in the record. It is titled "The Press Slices Up the Peace Dividend."

# Extra!

March-April 1990 Vol. 3 No. 3

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## THE PRESS SLICES UP THE PEACE DIVIDEND

By Robert Krinsky

For 45 years the U.S. public was told by its political leaders and media that large military expenditures were necessary to ward off the "Communist threat." From 1947 to 1989, according to the Pentagon comptroller, the U.S. spent $10.7 trillion on this mission (in 1990 dollars)—nearly as much as the value of all U.S. capital and infrastructure. With the winding down of the Cold War in Europe, the media have begun to extensively cover the "peace dividend"—the resources available as a consequence of reduced military spending.

The primary theme in mainstream news coverage is that the peace dividend will be small, and whatever sum is available should be used to reduce the federal budget deficit. The reporting has typically scoffed at or ignored those who would spend the funds on health care, education, environmental repair, infrastructure, affordable housing and other national concerns that have been deferred in the name of the Cold War.

In a story headlined "The Myth of the Peace Dividend," Newsweek (12/25/89) pronounced that the "whole idea of a colossal Peace Dividend is a fallacy." A Time cover story segment (2/12/90), "The Peace Dividend: Myth and Reality," claimed that the sum will be "relatively puny." Readers

Please turn to page 4

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of USA Today (2/12/90) were told: "Euphoria about a 'peace dividend' isn't new. It occurred at the end of every major war and was usually undone by economic recessions or, after Vietnam, by high inflation."

USA Today obscured several facts: Military spending (adjusted for inflation) never dropped back to 1940 levels after World War II; recent military build-ups—Korea, Vietnam, the Reagan years—occurred as part of the permanent war economy of the Cold War; and close to 60 percent of today's nearly $300 billion military budget is still devoted to the Soviet "threat." Far from "puny" or a "fallacy," a study by the U.S. Conference of Mayors found that the impact of a shift of even $30 billion over the period 1986-1990 from Pentagon to key urban programs would have yielded 195,000 more teachers, 409,000 additional placements in Head Start, 900,000 public housing units brought up to federal standards, and other gains.

## Biased Sourcing

The mass media's near-consensus on the peace dividend is conveyed through biased sourcing and framing techniques. Those who support investing the peace dividend in social needs are marginalized by omission, by infrequency, and by negative characterizations.

For example, national media failed to cover the Jan. 25 press conference at the annual mid-winter meeting of the U.S. Conference of Mayors, in which New York Mayor David Dinkins and his colleagues appealed for the peace dividend to go to pressing urban needs.

The media have also consistently ignored the perspective of peace movement organizations on the size and uses of the peace dividend. No mention of these groups could be found in more than 35 articles on the peace dividend appearing in the Chicago Tribune, New York Times, Wall Street Journal, Los Angeles Times, St. Louis Post Dispatch, Dallas Morning News, USA Today, Time and Newsweek, or in TV news segments on ABC's Nightline, NBC's Today Show and PBS's MacNeil/Lehrer News Hour, between November 198: and January 1990.

One of the only times peace organizations were included in the peace dividend discussion was a New York Times story—"Those For Whom 'Peace Dividend' Means Deficit" (2/12/90)—examining how the end of the Cold War has wrought financial trouble for the movement. Although the Times told its readers about "plummeting morale" at "SANE/Freeze, the largest peace group in the country," there was no mention of the SANE/Freeze peace economy campaign, which focuses on economic conversion and the peace dividend.

## Reducing the Debate to Reducing the Deficit

In articles and news analysis, one view was given favorable coverage: that any peace dividend should be used to reduce the federal budget deficit. The Wall Street Journal presented its verdict in a headline (12/4/89): "'Peace Dividend' From Winding Down Cold War Would Disappear Into Sinkhole of U.S. Deficit." Time asserted (2/12/90) that "the best possible use for any peace dividend is reduction of the federal deficit," and warned that "special interest groups" are "already lined up to grab whatever savings result from defense cuts."

Those who want to use the peace dividend "to meet problems in education, housing, drug control and other areas" were identified as "lobbyists" in a peace dividend news analysis which appeared on the front page of The New York Times (12/14/89). Counterposed to the "lobbyists" were "many economists and politicians" who warned that "in the first few years the money saved will be needed to eliminate the huge budget deficit."

The Los Angeles Times (12/26/89) placed the National Education Association in the "political interest" category for its proposals to invest in early childhood education, but described Senator Pete Domenici (R-NM) as a "leading budget expert" who "warns that [peace dividend] savings are likely to be modest and wants to use them to reduce the still outsized federal deficit." In 1989, "budget expert" Domenici received more than $50,000 in PAC contributions from military contractors.

## Blaming the Public

News articles in the major media even blamed the public rather than the military build-up for the budget deficit. Time (2/12/90) ridiculed the prospect of spending the peace dividend: "The worst outcome would be for the U.S. to beat swords into more credit cards." "This already famous peace dividend won't eliminate the deficit...but it could be a good-sized down payment," argued The Wall Street Journal (11/17/89). "Profligacy is fun. But it means that the U.S. isn't investing enough to assure a better life for our children and grandchildren."

The "fiscal responsibility" of such publications—which were cheerleaders for wasteful military build-ups—is a bit disingenuous. The issue is how, not whether, to invest public money. In the 1980s, borrowed funds went principally into economically non-productive military spending. Had the money gone into education, infrastructure and modernization of civilian production, the country would today be in a better position to pay off its debt.

The media's attempt to manage public opinion about the peace dividend is also evident in their presentation of polling data. While The New York Times published a peace dividend poll (2/18/90) reporting that "62 percent of Americans, representing a large majority of every demographic group, would spend the money 'to fight problems such as drugs and homelessness,'" the Times dismissed this expression of public will with the observation that "the public may be disappointed" because the money may just not exist. The arrogant tone casts the public as a passive recipient of the political process, unable to act on its desires; the media, meanwhile, are seemingly oblivious to their role in limiting the public's options.❑

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*Robert Krinsky is Program Director of the National Commission for Economic Conversion & Disarmament (162l Connecticut Avenue NW, Ste 350, Washington, D.C. 20009; (202) 462-0091). On May 2, the Commission will hold a nationally broadcast town meeting on "The U.S. After the Cold War: Claiming the Peace Dividend."*

As you read the review of what has appeared in the American print media in particular, you cannot escape the understanding that the writers are looking at a different world from the world that is visible to the mayors of American cities. The mayors of American cities, convened in the U.S. Conference of Mayors, passed a very strong resolution in December 1989 affirming the importance of and laying down a demand for a major peace dividend, appropriate in scale to meeting the desperate problems that the mayors confront.

## ECONOMIC CONVERSION AND PEACE DIVIDEND RESOLUTION

WHEREAS, movements toward democratization in Eastern Europe over the past several months are truly historic and promise to open up a new chapter in relations between the Soviet Union and the United States; and

WHEREAS, the current climate in international relations is conducive to continuing relaxation of tensions between the United States and the Soviet Union; and

WHEREAS, traditional defense postures, strategies, and commitments must be thoroughly reevaluated in light of the change of events currently underway in Eastern bloc countries; and

WHEREAS, power in today's world is increasingly measured more in terms of economic rather than military power; and

WHEREAS, during the 1980's the United States was transformed from the world's largest creditor nation into the world's largest debtor nation; and

WHEREAS, the policies of the 1980's relied upon a massive peacetime military buildup and a consequent disinvestment in important domestic programs such as housing; transportation; environmental, economic and community development; and the basic social and physical infrastructure of our society; and

WHEREAS, the United States Conference of Mayors has consistently urged Congress and the Administration to set its fiscal house in order while reordering its budgetary priorities; and

WHEREAS, a sensible reordering of budgetary priorities which addresses the crucial domestic needs of this nation can be achieved by realizing significant reductions in defense spending, the so-called "peace dividend", without compromising our national security needs, and reducing the federal budget deficit can be achieved by raising federal revenues in a fair, equitable, and progressive way which adopts an ability-to-pay principle without adversely affecting continued economic growth;

NOW, THEREFORE, BE IT RESOLVED that the United States Conference of Mayors calls on Congress and the Administration to agree upon a new defense posture predicated upon these new global realities; and

BE IT FURTHER RESOLVED that the United States Conference of Mayors calls on Congress and the Administration to agree upon a long-term reduction in defense spending commitments which realize significant savings beginning in the upcoming fiscal year, not merely reducing anticipated proposals for increases but by reducing the current baseline; and

BE IT FURTHER RESOLVED that the United States Conference of Mayors endorses the enactment of economic conversion' legislation, a long term national strategy which includes a comprehensive plan preparing defense-related industries, bases, and laboratories to convert to civilian production with a minimum loss of jobs and which does not adversely affect those defense-related economies; and

BE IT FURTHER RESOLVED that the United States Conference of Mayors urges the adoption of legislation which would provide economic adjustment assistance to workers and business in the defense industry and provide grants to local governments to aid communities that would be severely impacted by cuts in defense expenditures; and

BE IT FURTHER RESOLVED that the United States Conference of Mayors urges Congress and the Administration to reorder its budgetary priorities in a way which addresses the key urban problems facing our nation including the war on drugs, inadequate housing, growing homelessness, a crumbling infrastructure, deteriorating transportation systems, an inadequate commitment to quality education, a public health system stretched thin by the high cost of health care and a lack of federal commitment to health care and housing for AIDS patients, and multifaceted environmental concerns; and that the "peace dividend", in conjunction with increased revenues, be used to fund these reordered priorities and reduce the federal budget deficit.

BE IT FURTHER RESOLVED that the United States Conference of Mayors urges Congress and the Administration to utilize the "peace dividend" to accomplish such a reordering of priorities.

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To our considerable regret there is a chorus in the media resounding to the idea that there was no peace dividend, there is no peace dividend, there will not be a peace dividend. And those who talk about a peace dividend are designated lobbyists.

The mayors of the country, if the press or others wish to mark them as lobbyists, will be very pleased to honor that designation as lobbyists for the American people, which is precisely what they are in advocating a major peace dividend.

A third point that is important here—it is raised frequently—is the question: if there are to be reductions in military-type expenditures, which now take up about half of the administrative budget voted by the Congress, ought this not be used to retire debt?

My response to this is, on a level of principle, of some fundamental importance. When debt is incurred on grounds of facilitating productive investment, then such indebtedness is highly constructive for yielding new wealth, which makes possible the repayment of debt and also generates new wealth well beyond what is represented in the indebtedness.

When debt is incurred in honor of non-productive investment, in producing goods and services that do not constitute part of ordi-

nary consumption or means of production, then that debt leads to grave fiscal problems of every sort, and that is what we have been grappling with in this country for some time.

The present problem for the Congress is to ask what to do with the peace dividend. In honor of these considerations consider that not making the debt repayment now is as though taking another loan. That is the repayment foregone. But that repayment foregone invested in new wealth production will yield a rich return facilitating the repayment of debt and then some.

Accordingly, my recommendation is that reductions in military budget be disposed of 90 percent for the purposes of peace dividend, 10 percent of debt reduction, the latter being a clear earnest of taking responsibility for the debt.

Point four. What can we expect as the pace of DOD budget reduction under the impact of the close of the Cold War? Until now the discussions, let alone the actions themselves, have been sporadic. Each day brings a new estimate from some members of government, from the White House, from the Department of Defense, from assorted private bodies who have done studies on military budget. Some purport to make estimates of desirable reductions based on projections of what has been done in the past. Others are a little more venturesome and suggest, as did Robert McNamara, that military budget be put down to the nominal level prevailing in the administration of Jimmy Carter.

If this pattern is continued it leads inevitably not only to general economic disorder, but to grave problems for the Members of the Congress and their constituents. As noted by Senator Pell—and this repeats throughout the country—military industry bases and laboratories are highly concentrated by location, by industry, by occupation and, therefore, what seems a shift in a small proportion of the U.S. work force falls as a hammer blow on particular regions, industries and occupations.

Accordingly, a strategic plan is needed. That strategic plan must have two components, economic conversion planning and second a systematic pattern for reversing the arms race. The systematic pattern for reversing the arms race is given to us in plans drawn up 28 years ago and put before the public.

In order to address the problem of an economic conversion mechanism—and this is my fifth point—we have to free ourselves from a series of myths that have dominated discussion in public life for the last 40 years. I ask the committee to receive for the record the brief statement of the main agenda of the National Town Meeting of May 2, 1990, that was convened by the National Commission for Economic Conversion and Disarmament.

**WELCOME TO THE FIRST NATIONAL TOWN MEETING ON THE PEACE DIVIDEND**

## Wednesday, May 2, 1990

# "U.S. AFTER THE COLD WAR: CLAIMING THE PEACE DIVIDEND"

**Broadcast Live On**
**The Special ECD Radio Network**
**from the**
**National Press Club, Washington, D.C.**

**A Production of**
**The National Commission for Economic Conversion and Disarmament**
**Washington, D.C.**

**Moderator: Studs Terkel**

**Co-Produced by:**
**Chuck Alton and Robert Lewis Shayon**

**Designed by:**
**Seymour Melman and Robert Lewis Shayon**

**Syndicated and Distributed by:**
**U.S. Radio**

**Executive Producer:**
**Seymour Melman**

**Conceived by:**
**Jonathan Feldman and Robert Krinsky**

**Directed by:**
**Chuck Alton**

**Part One: Eleven Cold War Myths**

1. **"Military spending makes prosperity for all."**

Comments by George McGovern,
former U.S. Senator, (D-SD)

2. **"Military spending promotes security."**

   Comments by Claudine Schneider,
   U.S. House of Representatives, (R-RI)

3. **"Peace means a depression."**

   Comments by George Kourpias,
   President, International Association of Machinists
   and Aerospace Workers

4. **"We don't have to prepare for conversion from a military to a civilian economy - the market will take care of it."**

   Comments by Claiborne Pell,
   U.S. Senate, (D-RI)

5. **"American wealth is unlimited."**

   Comments by Nina Chamyan,
   Student Action Union

6. **"It's no use trying to plan conversion - it's too difficult."**

   Comments by Reverend Jesse Jackson,
   Chair, National Rainbow Coalition

7. **Military spending doesn't seriously damage our natural resources.**

   Comments by Barry Commoner,
   Director, Center for the Biology of Natural Systems

8. **"Spending on military is not different from spending on anything else."**

   Comments by David Dinkins,
   Mayor, New York, NY

9. **"Military spin-offs benefit civilian technology."**

   Comments by Susan Fox,
   Director of Finance, Southwestern Bell Corporation

10. **"The world being as it is, we can't afford to let down our military guard."**

Comments by Marcus G. Raskin,
Senior Fellow, Institute for Policy Studies

11. **"The U.S. should be the policeman of the world."**

Comments by Angela Sanbrano,
Executive Director, Committee In Solidarity with
the People of El Salvador

COMMENTATORS

Wilson Goode, Mayor, Philadelphia, Pennsylvania
Richard F. Celeste, Governor, Ohio
Eleanor Smeal, President, The Fund for a Feminist Majority
Bernard Sanders, Former Mayor, Burlington, Vermont
Norman Rice, Mayor, Seattle, Washington
Michael Renner, Worldwatch Institute, Washington, D.C.

## Part Two: Local Town Meeting Reports

**Los Angeles, CA**
Lou Kiefer,
International Association of Machinists and Aerospace Workers

**Chicago, IL**
Bernice Bild,
City of Chicago Conversion Commission

**St. Paul, MN**
Claudette Munson, International Brotherhood of Electrical Workers

**Boston, MA**
Raymond Flynn, Mayor, Boston, MA

**Las Cruces, NM**
Jeanne Culbertson, Community Organizer

**Seattle, WA**
Norm Rice, Mayor, Seattle, WA
R. Jim Evans, Professor, University of Washington

**Atlanta, GA**
Maynard Jackson, Mayor, Atlanta, GA

**San Francisco, CA**
Daniel Ellsberg, author and activist

**New York, NY**
Jim Haughton, Harlem Fight-Back

**Miami, FL**
Gilbert Raiford, Professor, Barry University

**Part Three: Open Phone-Ins from Around the Country**

**Conclusion: What can we do?**

Seymour Melman,
Chair, National Commission for Economic Conversion and Disarmament

**The Commission would like to thank the following who worked to help organize and produce the National Town Meeting:**

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Coaliton on Human Needs
Gray Panthers
International Association for Machinists and Aerospace Workers
League for Innovation in the Community College System
National Community Action Foundation
National Council of Senior Citizens
National Rainbow Coalition
Peace and Freedom
Progressive Student Network
SANE/FREEZE
Student Action Union
The Center for Innovative Diplomacy
U.S. Student Association
War Resisters League
Women's International League for Peace and Freedom

That town meeting, titled "The U.S. After the Cold War Claiming the Peace Dividend," highlighted discussion of 11 Cold War myths. I will note the first three for this discussion. Myth number one: Military spending makes prosperity for all. I am very pleased that Senator George McGovern made proper mincemeat of that one, and that was heard by publics from about 40 radio stations with discussions of a collateral sort in 1966. The second myth was that military spending promotes security. The third myth is that peace means a depression.

A reading of the nature of these myths and of the discussions around them suggests that we need to free ourselves from these mistaken, inaccurate, invalid understandings to enable us to proceed with constructive proposals for coping with economic conversion.

An economic conversion mechanism must address the institutions that have been set in place during the long Cold War. These are the institutions of government and of nominally non-governmental bodies. In government they are the familiar national security agencies. In the private economy the institutions are the great array of firms, laboratories and the like that act on behalf of the military enterprise.

It is crucial to appreciate that in the case of the nominally private firms, they operate in a fashion that is wholly different from the textbook models of industrial enterprise. The military serving firms maximize cost, and attain profitability by exploiting the difference between cost maximizing and subsidy maximizing. These conditions of operation were never voted upon by the boards of directors or chief executive officers of these firms. These are the conditions that evolve as an ordinary consequence of properly observing the rules laid down by the top management of this network. That top management comprises the 120,000 personnel of the central administrative office of the Pentagon, that controls principal policy and oversee operations in 35,000 prime contracting establishments and a much larger number of principal subcontractors.

In order to carry out competent economic conversion my colleagues and I have given careful thought to the criteria for economic conversion legislation. We have examined the data of industrial management. We have sought out the experience of consulting engineers and managers. We have examined the historic record in the United States and elsewhere, and from all of this we have prepared a briefing paper titled "Criteria for Economic Conversion Legislation." It is jointly authored by Jonathan Feldman, Robert Krinsky, and Seymour Melman.

[The entire document referred to will be retained in committee files.]

# LEGISLATIVE UPDATE

## SELECTED EXPLANATORY NOTES ON CRITERIA FOR ECONOMIC CONVERSION LEGISLATION

by Jonathan Feldman and Robert Krinsky

Four separate economic conversion bills have been introduced into the 101st Congress. There has been some confusion as to the merits of these bills and what their actual differences. We review below some of the necessary criteria for successful conversion. The accompanying table shows which criteria are met by the four bills.

*Mandatory Alternative Use Committees*

The creation of these committees would insure that every firm and base be prepared for cutbacks in its military-related activities by having plans on hand when such cuts are implemented. Such mandatory planning would create constituencies that are economically prepared for arms reductions at military establishments throughout the country.

*Advance Conversion Planning, Blueprint Ready*

It makes little sense to delay planning for economic conversion until contracts have been cancelled or seriously reduced. Considerable time is required for planning alternative use of buildings, equipment, and people. A period of two years is the time allotment usually required for these planning functions.

*Decentralized Control of Alternative Use Planning by Management and Labor*

A remotely positioned centralized planning organization is very poorly suited for economic conversion planning. Administration of planning in a decentralized fashion is far less expensive and would be more effective than centralized procedures.

*Mandatory Occupational Retraining*

Professional retraining is a particularly important matter for the managerial and engineering-technical occupations. Managers have become highly specialized, as required by the particular rules and modes of operations suitable for servicing the military. Engineers who have become accustomed to design and related

operations that are carried out with relative indifference to cost must be fundamentally reoriented to the design problems which must be solved where cost minimizing and civilian reliability requirements dominate the scene.

*Financed Without New Appropriations or Taxes*

The *Defense Economic Adjustment Act* establishes a fund to cover federal payments provided for in the bill. The operations of the Alternative Use Committee are financed on a contract-by-contract basis as part of the standard overhead charges. All defense contractors will be legally obligated to pay into the fund at an annual rate of 1/4 percent of the value of the gross revenues from the contract. In addition, the government pays into the fund 10 percent of projected savings from a cancellation or reduction of the program or contract. An alternative finance mechanism now endorsed by Representative Ted Weiss would draw a 1 and 1/4 to 2 percent portion of the Pentagon's budget for procurement, research and development, and the Department of Energy's atomic weapon's budget.

The *Defense Production Act* provides for worker benefits through a fund built by deposits from 10 percent of the projected savings of a cancelled contract. The bill does not specify the funding sources for assistance to communities eligible for economic adjustment assistance and for the fees paid to state employment agencies participating in the program. *The Economic Diversification and Defense Adjustment Act of 1989,* finanaces assistance through a new grant program requiring separate appropriations. There is a $250,000 grant limit to each community. Financing for the unemployment, retraining, and community assistance provisions of *The Economic Stabilization, Adjustment, and Defense Industry Conversion Act of 1990* (H.R. 3999) is contingent upon monies allocated through the annual appropriations process.

*The Defense Diversification Act of 1990* (S.2097) establishes a Defense Economic Adjustment Fund built through annual contributions mandated from defense contractors in the amount equal to one percent of the contractor's gross annual revenues realized from the contract in the preceeding year, and 10 percent of projected financial savings resulting from curtailment or termination of defense contracts and the closing or realingnment of military installations.

*Capital Investment Planning by Government*

Military spending, while only a small share of the Gross National Product, has employed large numbers of engineers, technicians and skilled production workers and represents a vast capital fund which could be used for investment in civilian alternatives. The basis for competitive economic growth has been seriously threatened by this diversion of financial, labor and technological resources towards military applications. By making new public investments in infrastructure, new markets for converted firms could be developed. Pat Choate estimated in1982 that $2.5 trillion to $3 trillion in public works investment would be needed by 1995 just to maintain existing levels of services. The first step of meeting such potential markets is to carry out assessments of local and regional capital needs.

NOTE: For further analysis on these criteria and additional aspects of a competent conversion policy, see: ECD Briefing Paper Four, *Criteria for Economic Conversion Legislation* by Jonathan Feldman, Robert Krinsky and Seymour Melman, (Washington, D.C.: National Commission for Economic Conversion and Disarmament, December 1988).

Prepared by the National Commission for Economic Conversion & Disarmament, Suite 350, 1621 Connecticut Ave., N.W., Washington, D.C. 20009, (202) 462-0091

May 1990

## A GUIDE TO FOUR BILLS IN THE 101st CONGRESS

| | H.R. 101 Weiss | H.R. 2852 Gejdenson/ Mavroules | H.R. 3999 Oakar | S.2097 Pell |
|---|---|---|---|---|
| 1) Mandatory Alternative Use Committees | Yes | No | No | No |
| 2) Advance Conversion Planning, Blueprint Ready | Yes | No | No | No |
| 3) Decentralized Control of Alternative Use Planning at the Facility | Yes | No | No | No |
| 4) Advance Notification of Contract Termination | Yes | not for bases | Yes | Yes |
| 5) Mandatory Occupational Retraining | Yes | No | Yes | No |
| 6) Community Economic Adjustment Planning | Yes | Yes | Yes | Yes |
| 7) Assured Income/ Benefit Maintenance | Yes | No | Yes | health, no income |
| 8) Relocation Allowances | Yes | No | Yes | Yes |
| 9) Financed without new appropriations or taxes | Yes | No | No | Yes |
| 10) National Network for Employee Opportunity | Yes | Yes | Yes | Yes |
| 11) Capital Investment Planning | Yes | No | Yes | No |

**Legend to Four Bills Introduced in the 101st Congress**

Weiss, H.R. 101:
*The Defense Economic Adjustment Act*

Gejdenson/Mavroules, H.R.2852:
*The Economic Diversification and Defense Adjustment Act of 1989*

Oakar, H.R. 3999:
*Economic Stabilization, Adjustment, and Defense Industry Conversion Act of 1990*

Pell, S. 2097
*Defense Diversification and Adjustment Act of 1990*

Prepared by the National Commission for Economic Conversion & Disarmament,
Suite 350, 1621 Connecticut Ave., N.W., Washington, D.C. 20009, (202) 462-0091. May 1990.

It is of some importance that appended to this briefing paper is the full text of a letter written in April 1943 by Mr. David Prince, vice president of the General Electric Company and addressed to the Chief of the War Production Board. He wrote here, "While no one could disagree with the necessity of winning the war first, there is a very general inclination to underestimate the length of time it takes to proceed from the conception stage to the tooling stage for any product. I have the feeling we are not devoting enough of that kind effort even to the war program itself." And he said further, "The very least time during which a new product can be conceived, models made and tested, and pilot plant production initiated is on the order of 2 years," and he went on to elaborate further.

These recommendations were taken up and led to a response by 1944 that induced a process then called postwar planning that played a very important role in the adjustment of industry and other facilities.

I call the attention of the committee to the series of principal criteria noted on page ii of this briefing paper. The strategic ideas contained there really focus on the following: that there be local responsibility and authority rather than centralized control. No "Gosplan" for the USA, and the closest thing that we have to that now is the central office of the Pentagon, and that institution must be diminished, restructured, regrouped.

The second criterion keeping with the recommendations is that there be advanced preparation and most critically that there be established in the military serving factories, bases and laboratories alternative use committees, composed of both management and employees and charged with responsibility for preparing complete technical and economic plans.

Our judgment is that the opposing ideas that have been set forth in various quarters, opposed to this type of detailed planning and local responsibility, consist of misleading propositions. One is that the market be left to cope with all this. This is a grim joke in the eyes of the thousands of men and women who are cut loose in highly and densely oriented military industry areas where there is little of any other "market" seeking their talents.

It is also suggested that the community be responsible for planning alternative use. I cannot envision the mayor of Bethpage, Long Island, being asked to take responsibility for redesigning in a technical and economic fashion the works of the Grumman Corporation that dominates the economic life of that region.

Finally, Mr. Chairman, I touch on the matter of the strategic plan which is needed for building down the military budget and the military establishment now that the Cold War is over. For this I call attention first to the statement of principles called the McCloy-Zorin Joint Statement of Agreed Principles for Disarmament Negotiations (1961) that were agreed between the Governments of the United States and the Soviet Union in September 1961.

[The information follows:]

## McCloy-Zorin Joint Statement of Agreed Principles for Disarmament Negotiations

Report of the Governments of the United States of America and the Union of Soviet Socialist Republics to the sixteenth session of the United Nations General Assembly on the results of their exchange of views on questions relating to disarmament and to the resumption of negotiations in an appropriate body, whose composition is to be agreed upon.

In accordance with their statements of 30 March 1961 at the fifteenth session of the United Nations General Assembly, the Governments of the United States and the USSR wish to inform the Members of the General Assembly of their exchange of views on questions relating to disarmament and to the resumption of negotiations in an appropriate body, whose composition is to be agreed upon.

1. The exchange of views took place in Washington, D.C. from 19 June to 30 June; in Moscow from 17 July to 29 July; and in New York from 6 September to 19 September 1961.

2. As a result of the exchange of views, the two Governments submit a joint statement of agreed principles which they recommend as guidance for disarmament negotiations when such negotiations are resumed. The text of these agreed principles is attached hereto in the form of a joint statement of the two Governments.

3. The two Governments were not able to reach agreement on the composition of a negotiating body prior to the sixteenth General Assembly.

### Joint Statement of Agreed Principles for Disarmament Negotiations

Having conducted an extensive exchange of views on disarmament pursuant to their agreement announced in the General Assembly on 30 March 1961,

Noting with concern that the continuing arms race is a heavy burden for humanity and is fraught with dangers for the cause of world peace,

Reaffirming their adherence to all the provisions of the General Assembly resolution 1378 (XIV) of 20 November 1959,

Affirming that to facilitate the attainment of general and complete disarmament in a peaceful world it is important that all States abide by existing international agreements, refrain from any actions which might aggravate international tensions, and that they seek settlement of all disputes by peaceful means,

The United States and the USSR have agreed to recommend the following principles as the basis for future multilateral negotiations on disarmament and to call upon other States to cooperate in reaching early agreement on general and complete disarmament in a peaceful world in accordance with these principles.

1. The goal of negotiations is to achieve agreement on a programme which will ensure that (a) disarmament is general and complete and war is no longer an instrument for settling international problems, and (b) such disarmament is accompanied by the establishment of reliable procedures for the peaceful settlement of disputes and effective arrangements for the maintenance of peace in accordance with the principles of the United Nations Charter.

2. The programme of general and complete disarmament shall ensure that States will have at their disposal only those non-nuclear armaments, forces, facilities, and establishments as are agreed to be necessary to maintain internal order and protect the personal security of citizens; and that States shall support and provide agreed manpower for a United Nations peace force.

3. To this end, the programme for general and complete disarmament shall contain the necessary provisions, with respect to the military establishment of every nation, for:

(a) Disbanding of armed forces, dismantling of military establishments, including bases, cessation of the production of armaments as well as their liquidation or conversion to peaceful uses;

(b) Elimination of all stockpiles of nuclear, chemical, bacteriological, and other weapons of mass destruction and cessation of the production of such weapons;

(c) Elimination of all means of delivery of weapons of mass destruction;

(d) Abolishment of the organizations and institutions designed to organize the military effort of States, cessation of military training, and closing of all military training institutions;

(e) Discontinuance of military expenditures.

4. The disarmament programme should be implemented in an agreed sequence, by stages until it is completed, with each measure and stage carried out within specified time limits. Transition to a subsequent stage in the process of disarmament should take place upon a review of the implementation of measures included in the preceding stage and upon a decision that all such measures have been implemented

and verified and that any additional verification arrangements required for measures in the next stage are, when appropriate, ready to operate.

5. All measures of general and complete disarmament should be balanced so that at no stage of the implementation of the treaty could any State or group of States gain military advantage and that security is ensured equally for all.

6. All disarmament measures should be implemented from beginning to end under such strict and effective international control as would provide firm assurance that all parties are honoring their obligations. During and after the implementation of general and complete disarmament, the most thorough control should be exercised, the nature and extent of such control depending on the requirements for verification of the disarmament measures being carried out in each stage. To implement control over and inspection of disarmament, an International Disarmament Organization including all parties to the agreement should be created within the framework of the United Nations. The International Disarmament Organization and its inspectors should be assured unrestricted access without veto to all places as necessary for the purpose of effective verification.

7. Progress in disarmament should be accompanied by measures to strengthen institutions for maintaining peace and the settlement of international disputes by peaceful means. During and after the implementation of the programme of general and complete disarmament, there should be taken, in accordance with the principles of the United Nations Charter, the necessary measures to maintain international peace and security, including the obligation of States to place at the disposal of the United Nations agreed manpower necessary for an international peace force to be equipped with agreed types of armaments. Arrangements for the use of this force should ensure that the United Nations can effectively deter or suppress any threat or use of arms in violation of the purposes and principles of the United Nations.

8. States participating in the negotiations should seek to achieve and implement the widest possible agreement at the earliest possible date. Efforts should continue without interruption until agreement upon the total programme has been achieved, and efforts to ensure early agreement on and implementation of measures of disarmament should be undertaken without prejudicing progress on agreement on the total programme and in such a way that these measures would facilitate and form part of that programme.

Source: United Nations Document A/4831-4895, General Assembly, September 20, 1961.

Following on those principles, the Government of the United States and of the Soviet Union later prepared detailed proposals for how to carry out a reversal of the arms race. The idea that such detailed proposals were drawn and were published has gone into limbo now for 28 years, down the memory hole, so to speak, unmentioned, unnoticed. But we now have a critical strategic need for paying attention once again and putting on the political table afresh the strategic idea of an ordered, negotiated, mutually agreed reversal of the arms race. For this we have available the document as issued by President Kennedy entitled "Blueprint for the Peace Race: Outline of Basic Provisions of a Treaty on General and Complete Disarmament in a Peaceful World."

[The document referred to will be retained in committee files.]

The plan laid out by President Kennedy, following formulation by his National Security Council staff and State Department and published by the Arms Control and Disarmament Agency, is a scheme that would achieve general and complete disarmament in three stages at the close of a 10-year period.

The National Commission for Economic Conversion and Disarmament recommends new attention to the original National Security Council plan as set forth by President Kennedy in April 1962. It will give us a basis for a fresh view of the strategy of building down the military enterprise. Collateral with that build-down on a mutually agreed and orderly basis, meaning a predictable basis, a statistically stable basis, we recommend putting in place an eco-

nomic conversion mechanism centered on local responsibility and authority, for the enterprises, bases and laboratories serving the Department of Defense. In this way the American people and its government will be well served by opening up the prospect of major new productive work for our country. Thank you, Mr. Chairman.

Senator BINGAMAN. Thank you. We would be pleased to include in our record all the items you referred to in your statement. Before we do go to questions, let me call on our other witness, Dr. Gordon Adams, Director of the Defense Budget Project. We are pleased to have you here.

## STATEMENT OF DR. GORDON ADAMS, DIRECTOR, DEFENSE BUDGET PROJECT

Dr. ADAMS. Thank you. It is a pleasure to be here, Mr. Chairman, and Senator Riegle as well. I am grateful for the opportunity to testify on an issue that is increasingly the focus of public policy.

It will be vital to asses carefully the consequences of declining defense budgets for the U.S. economy and the policies the private and the public sectors might consider to smooth the transition to lower levels of defense spending and to exploit the opportunities that might result. I should note that this subcommittee is already playing a valuable role in this national discussion by focusing on our national technology and industrial base and the role of the defense industry in strengthening that base.

My comments on the impact of the coming transition are based on work that we have been doing at the Defense Budget Project for more than 4 years. I should note in addition that significant work remains to be done. We at the project, along with the Henry L. Stimson Center, are currently providing support to a newly created task force on defense spending, the economy and the Nation's security, which is co-chaired by Senator Tim Wirth, a member of this subcommittee, and Senator John Heinz.

This task force draws it membership from the Congress, defense and non-defense sectors of industry and labor, State and local government, and former governmental officials. Its agenda is to examine in some depth the kinds of impacts that you are talking about today, to examine and define appropriate Federal, State and local adjustment policies and above all to explore the impact of these changes on the defense technology base and on Federal research and technology policy. We hope the task force will contribute to the discussion of this issue.

I want to make some very basic points, and I will summarize a great deal of my testimony which I request be put into the record.

Point number one, perfectly obvious to all of us, defense budgets, spending and contracting have all declined. The budget numbers are all familiar to you. They have been declining since 1985. Perhaps most interesting from the point of view of our subject today, the value of Defense Department prime contracts has fallen 25 percent in constant dollars since 1985. These changes preceded many of the changes happening in Eastern Europe and the Soviet Union and are now being reinforced by those changes.

Second, the budget and spending trends that we can foresee for the 1990s suggest there will be further decline, and I mention some details in my testimony. For example: The Cheney budget request projects a 2 percent average real decline through 1995; the review of four aircraft programs recently completed by the Secretary stretches out and reduces the ultimate production for those aircraft; the base closings lists—the one already happening and the one suggested by the Secretary. In my judgment that the actions by the Defense Department are, from their point of view, probably optimistic. Budget authority and outlays will both be reduced below the Secretary's request for 1991 and will fall significantly below DOD projections for 1992 to 1995.

Third, I should strike a balance with those numbers for some perspective, because I think context and perspective on this issue is important. I have material in my testimony, which will go into the record, indicating that the reductions in defense forecast by Senator Nunn and by the House budget resolution would leave fiscal 1995 budget authority respectively for Senator Nunn 10 percent above and for the House Budget Committee 3 percent below the fiscal 1980 level of defense budget authority in constant dollars.

Historically U.S. defense budgets have maintained a peacetime average of roughly $236 billion in constant 1991 dollars. The Nunn proposal would leave the 1995 budget authority at $255 billion in constant 1991 dollars, and the House budget resolution would set it at $227 billion, both close to the historic peacetime average.

In addition, the proposed Cheney budget and much of the congressional action we have seen to date remains a fairly hardware-heavy budget through mid-decade, which will have an impact on how we evaluate its consequences for the economy.

There also appears to be general support for fairly high continuing levels of research and development funding in the Department of Defense and, finally, whatever we can foresee—and these are somewhat murky times—suggest that the United States will continue to support a significant military force. Although it will be smaller, the reductions do not represent in my judgment a "for sale" sign over U.S. defense capabilities.

Now, what are the impacts of these kinds of changes as best we can foresee them on the economy: macroeconomically, microeconomically? Let me briefly touch on some points under those headings.

At the macroeconomic level first, in our judgment, the coming defense transition, even with conditions that have changed since my last testimony in December, is not likely to have a major impact on the U.S. economy at the macroeconomic level. Defense spending consumes too small a share of U.S. GNP for a shift of even 5 percent real per year to have a determining effect on the overall direction of economic activity.

In addition, in a recent rather exhaustive review of research on the impact of defense on the macroeconomy, we have concluded that defense spending in general is neither a major source of U.S. economic problems, investment productivity, competitiveness, nor a major source of its successes, growth or invention; I review that analysis in some detail in my testimony. But our conclusion is in large part consistent with other research and testimony on this

subject in recent months, whether from the banking community, the Federal Reserve Board or the Brookings Institution.

It has been suggested that the emerging peace dividend may have a healthy impact on the economy of the 1990s. It is important to note, I think, that in comparative historical terms the relative size of this dividend is likely to be small, and I have some evidence in the testimony that I will introduce.

The resistance of such a shift does involve considerable funds, and raise questions about Federal spending priorities, which the Congress will have to grapple with in the coming years.

Let me turn then to the penultimate subject of my testimony, which is the likely impacts where the rubber hits the road at the microeconomic level, and what may be some of the adjustment requirements. The questions that you have proposed to me in preparing for this testimony are relevant here: How will industry handle the decline in procurement? Can communities cope with the transition? What are the impacts on the work force? What Federal policies may be needed beyond current capabilities to handle these impacts?

In other words, have we fixed on the right target? And then, what legislation is needed?

It is important not to minimize the potential for dislocation due to these coming changes. These are very real impacts on firms, communities and workers, some of which are already being felt.

But let me first talk a moment about the industry, and a moment about communities, and a moment about the work force.

The impact of the transitions with respect to the industry are likely to be uneven. Uneven, driven in part by the fact that the industry has a considerable backlog of appropriated but unspent funding for hardware programs.

Second, although projected defense budgets decline, they continue to be procurement and R&D heavy, with rising budgets at Energy and NASA. But that is really all background for the industry, because from the industry's point of view, the question is how do they cope, given the specificity of changes.

And I think what is important here, if one message comes across at all, is that the defense industry—and there is some question as to whether it is in fact a separate industry—is not a monolith. Not all defense firms are alike. Not all have the same vulnerabilities. Not all have the same flexibilities.

And in my testimony I detail groupings of industries and suggest differences in their ability to cope with these coming reductions, the grouping being basically defense-dependent majors, the Lockheed/Northrop-type company, who have some difficulties, grave difficulties with adjustment, depending on what is decided.

A second group of companies, less dependent, which I call diversified major contractors, who have a proven track record for managing commercial businesses successfully, though they segregate their defense from their commercial business, and are likely to have greater flexibility in this declining market.

A third grouping called low dependency-majors are commercial contractors which maintain defense divisions. And I describe their adaptation capabilities.

The marketing majors are a fourth group of companies that essentially sell to defense what they sell in the private sector.

And finally, small business contractors, which may be the most interesting problem and dilemma for public policy. Many of these companies are defense dependent, but maybe less so than we imagine; we need a great deal more data on them. Many of them may be considerably more diversified than we think and have significantly more overlap between their defense and non-defense work than do many major contractors.

Harvard researcher Lou Branscomb, for example, testified this March that smaller defense contractors tend to be more capable of dual-use work since "they do not as often separate their defense and civil R&D into arms-length businesses."

Now there are a number of strategies available to the industry, which I have described, and it is important, I think, to recognize that a significant responsibility for the transition should properly rest with the companies, which are, on the whole, more flexible and diversified than is sometimes thought.

Federal policy should, above all, be flexible, focusing on information gathering and dissemination and on information on strategies for managing change. Federal mandating of specific corporate responses in exclusion of others is, in my judgment, inappropriate.

One small Long Island contractor, Frisby Airborne Hydraulics, has underlined this distinction with respect to the transition for defense contractors. Frisby has successfully diversified its business from defense to commercial markets. In part, this was relatively easy because the product and its market were quite similar in the defense and non-defense segments of the aircraft industry to which they sell. In part, it flowed from a successful strategy by corporate management, with labor involvement.

But the CEO of Frisby was firm about one point in his March testimony to the Joint Economic Committee this year, "The Government's role in this effort should be that of facilitator. True conversion will not occur as a result of laws mandating conversion." Such laws, he noted, should not be passed "in any form."

With respect to communities, the affected communities and the State have a critical role to play in adjustment to such decisions on the budget. Again, context is critical here. We are undertaking a rather intensive research effort on community and State dependence on defense. But our preliminary indications, some of which are reported in the testimony, indicate substantially lower community dependency on defense spending than is often feared or described.

It varies enormously. It is not evenly distributed from State to State. But 32 States, for example, do less than 6 percent of total State output in the defense sector. And I cite some specific California data in my testimony. It is a pattern that impressionistically is true across the country, with exceptions. And it is important to examine each community and each State on a case-by-case basis, rather than generalize.

The other ingredient of community adjustment is the existence of State and local structures, policies and funding for local economic development and job retraining. These, too, are distributed unevenly. Available evidence suggests that many States, for example,

Michigan, New York, and California, have significantly stronger State and local economic development and retraining programs than existed 20 years ago.

Again, I repeat, these are uneven, and probably need some modelling from State to State. But States, in our judgment, are best suited to deal with the transition issues directly.

State surveys currently going on or just completed in Florida, Ohio and Maryland, are developing databases on the kinds of problems firms and communities might face. States and localities have an important role in facilitating access to information on business opportunities and State services.

The Federal Government's role involves anticipating budget changes, investigating their likely regional impact, and facilitating community responses and access to Federal programs. And I discuss in my testimony the role of the Office of Economic Adjustment in the Defense Department, the role of the Economic Development Administration in the Commerce Department, and the role of the Government in facilitating flexibly.

Third, with respect to the work force, the human consequences of layoffs are real and the Federal Government has not always responded well to them. In defense, as in other areas, Federal policy on human resources is going to be critical to the future performance of our national economy.

The defense labor force is considerably more broadly skilled and more transferably skilled than we sometimes imagine. The impact on the work force is going to depend very much on the context in which the changes happen: Is there a labor market for those skills? Is there demand for the products that are made in those markets?

That, again, demands rather detailed research and information.

There are major differences we need to be attentive to. For example, in the early 1970s, the decline in defense employment coincided with the end of the Apollo space program and a significant decline in commercial aircraft orders, with a devastating impact on the work force. The situation may be different today with a large commercial backlog and rising NASA budgets providing employment opportunities.

For the work force at the corporate level, State and local retraining, job search and relocation programs can play an important role.

At the Federal level, the health of the American economy cannot afford to ignore this human resource issue. It is an important, technologically sophisticated asset, this defense work force. A Federal approach should include an increase in Job Training Partnership Act Title III resources, better use of those resources at State and local levels, and more active use of the Labor Secretary's Discretionary Fund.

Finally, some guidelines, as your committee begins to do its work, and as Senator Riegle's task force does its.

First, the state of the national, regional and local economy is key. In an unhealthy economy, few adjustments are happy ones. In a healthy economy, success may come as a matter of course.

Second, flexibility of approach is a fundamental ingredient of adjustment policy.

Third, the private sector role is crucial.

Fourth, while defense is a national problem, economic adjustment is largely local.

Fifth, while it is probably inevitable that the Congress will single out defense for adjustment policy efforts, given the current context, a broader policy approach always make sense.

Sixth, warning is critical. The earlier the affected parties know of a pending change, the more effective their adjustment planning will be.

Seventh, most of the Federal level adjustment policy tools already exist, but will require greater funding. Beware of the reinvented wheel.

I commend to your attention, in addition to what I may say in my testimony, the statement in this respect endorsed by 12 members of the National Governors Association. The Governors' statement, which I am sure all of you have seen, as well as the results of the work on the other side of Capitol Hill, the majority leader's task force over there, which is likely to produce a piece of legislation that is fairly compatible with the approach I have suggested.

And I commend these, too, both to the task force and to your committee.

Finally, let me just point out that all of these adjustment issues are going to be overwhelmed by the major problem that this subcommittee has addressed centrally. And that is that probably the most important contribution the Federal Government and the private sector can make to a successful transition in an era of declining defense budgets, would be to address frontally the broad agenda of research, development and technology for the year 2000 in our country.

Our Nation's technological strength is an increasingly central element of our national security. And given our large public sector investment in defense technologies, and the even more rapid growth in private sector, non-defense R&D, the defense, civil and commercial aspects of technology and R&D policy are truly inseparable.

I point out in my testimony some of that inseparability, and then go into some detail on the defense side, not incompatible with what Jack Gansler testified earlier about the kinds of changes that may be needed to break down the barriers that separate the two kinds of technologies in the American economy.

It is absolutely critical, in addition, I think, that the Defense Department not in fact be seen as the sole lead agency in Federal research and technology policy. It is critical for the Federal Government to address broader national objectives in this area, which means reviewing funding levels and incentives for non-defense commercial technology development, the roles of such agencies as the National Institute on Standards and Technology, the National Science Foundation, and other Federal departments, and the importance of the Federal market for private sector technology development.

For years, as Jack Gansler said, we have had industrial and technological policies, but little coherent strategy connecting those policies. It is in fact a statement that I even heard you yourself, Senator, make a couple of days ago at a conference.

It is not a question of whether the Federal Government has a role, it is one of how consciously we should define that role, and how it should be implemented in partnership with the private sector.

Thank you very much.

[The prepared statement of Mr. Adams follows:]

**TESTIMONY OF DR. GORDON ADAMS**
**DIRECTOR, DEFENSE BUDGET PROJECT**

## ECONOMIC ADJUSTMENT TO LOWER DEFENSE SPENDING

I am Dr. Gordon Adams, Director of the Defense Budget Project, a non-profit research group here in Washington, DC working on defense budget and policy issues and on the relationship between defense spending and the American economy. I am grateful for the opportunity to testify today on an issue that is increasingly a focus of public policy: the consequences of declining defense budgets for the U.S. economy and the policies the public and private sectors might consider to smooth the transition to lower levels of defense spending and to exploit the opportunities that might result. This subcommittee is already playing a valuable role in this national discussion, by focusing on our national technology and industrial base and the role of the defense industry in strengthening that base.

Let me briefly summarize the thrust of my testimony. The transition to lower defense budgets has been underway since 1986 and will almost certainly continue through the next decade. Defense budgets are likely to decline to roughly a $240 billion level, in constant 1991 dollars, by mid-decade, 23 percent below the FY 1990 level and 16 percent below the level currently projected by the Defense Department. Declining budgets will be accompanied by a significant downsizing, relocation and restructuring of U.S. military forces: a smaller, lighter active duty Army with significant reserves; a smaller Air Force oriented toward lift and power projection missions; a somewhat downsized Navy oriented toward sea lane control and power projection; and a somewhat smaller Marine Corps.

This smaller force, based largely in the United States, will require less infrastructure and shorter hardware production runs than currently projected. At the same time, the force will continue to require significant budgetary resources for new hardware and for sustained levels of research and development spending.

This fundamental shift in military missions and downsizing of forces will have an uneven impact on the economy. A budget decline of roughly five percent per year after inflation should provide an opportunity for accelerated deficit reduction and, over the medium term, some increases in funding for non-defense programs. The impact of shifting this relatively small share of Gross National Product at this rate to other purposes will have a minimal effect on the economy as a whole.

The important impacts may be at the microeconomic level:

- For the defense industry, the substantial DoD funding backlog and a rather greater degree of diversification within defense firms than is sometimes understood, should help many companies handle the transition. Particular attention needs to be paid to understanding the problems of smaller defense contractors and subcontractors and to assisting their transition.

- States and communities with a substantial defense presence can also anticipate some impact, although the depth of these impacts will vary greatly with the overall health and diversification of the regional and national economies. The diversification of defense-related economies appears to be substantially greater today than it was twenty years ago. Moreover, state and local economic development and diversification planning capabilities are generally stronger than they were twenty years ago, which can help the transition at the community level.

- The workforce involved in defense research and production deserves special attention, though here, once again, the impact will be uneven, depending on which specific defense programs are affected and on the state of the labor market for the skills of dislocated workers. Serious federal attention to retraining and job search support will be required, using existing institutional capabilities with increased funding.

The key to sound federal policies for the defense transition will be flexibility of approach, the avoidance of dogma, proper attention to a mix of public and private sector responsibilities, an effective combination of federal activity (using existing institutions and programs) and state and local efforts, and adequate warning to communities of pending changes and potential dislocations. It would be preferable for federal policy not to single out defense impacts for special attention, but, rather, to embed defense adjustment activities in wider federal programs dealing with adjustment and dislocations in general.

Finally, the centerpiece of any federal effort should focus on the development of active federal policies for technology, research and development and competitiveness, including: active encouragement of dual use technologies as a way of contributing both to overall competitiveness and to the preservation the defense industrial base; sustained high levels of federal support for research and development (both defense and non-defense), and increased federal encouragement of civil and commercial high technology research.

My comments on the economic impact the coming defense transition are based on work we have been doing at the Project for more than four years. I should note, however, that significant work remains to be done in this area. We at the Project, along with the Henry L. Stimson Center, are currently providing support to a newly-created Task Force on Defense Spending, the Economy and the Nation's Security, which is co-chaired by Senator Tim Wirth, a member of this Subcommittee, and Senator John Heinz. This task force is drawing its membership from the Congress, defense and non-defense sectors of industry and labor, state and local government, former governmental officials. Its agenda is to examine in some depth the impacts of the coming defense transition, to define appropriate federal, state and local adjustment policies and, above all, to explore the impact of these changes on the defense technology base and on federal research and technology policy. We hope the work of this task force will contribute to the discussion of this issue, a discussion in which this subcommittee will play an important role.

## Defense Budgets, Spending and Contracting Have Already Declined

The defense market has been shrinking since Fiscal Year 1985:

- National defense budget authority rose 55 percent in real terms between FY 1980 and FY 1985, and has fallen 13 percent through FY 1990.

- Defense spending (outlays) lag these changes, increasing only 42 percent through FY 1987 and falling an estimated five percent from FY 1987 through FY 1990.

- Budgets for defense procurement (including the nuclear warhead programs of the Department of Energy) rose 112 percent in constant dollars through FY 1985, but fell 26 percent from FY 1885 through 1990. Outlays for procurement rose 78 percent, peaking in FY 1987, but fell 9 percent from FY 1987 through FY 1990.

- Budgets for defense RDT&E have changed less significantly than those for procurement. Budget authority rose 95 percent in constant dollars through its

peak year of FY 1987, and subsequently fell eight percent through FY 1990. Outlays rose 88 percent through the peak year of FY 1989, then fell five percent in FY 1990.

- The value of Defense Department prime contracts also fell, declining 25 percent in constant dollars between FY 1985 and FY 1989.

These budgetary and spending changes preceded the dramatic events in the Soviet Union and Eastern Europe; they were driven largely by the requirements of deficit reduction after Gramm-Rudman-Hollings was passed in 1985, and by increasingly persistent demands for federal spending on non-defense purposes, including cleaning up of nuclear plants, combatting drug use, bailing out the savings and loan industry and improving programs for health, education and children. The effective disintegration of the Warsaw Treaty Organization and unilateral reductions in Soviet forces, weapons procurement and defense budgets since 1988 have caused sustained downward pressure on defense budgets.

Budget and Spending Trends in the 1990s

Given the federal deficit, domestic needs and the declining Soviet threat, this downward trend will continue. The Defense Department has already begun to acknowledge the inevitability of declining resources:

- In November 1989, Secretary of Defense Cheney asked the services to reexamine their budget and program plans for FY 1992-94, with an eye to reducing total budget authority in those years by as much as $180 billion.

- The FY 1991 defense budget, which Secretary Cheney has described as a "transitional" budget toward that era of lower resources, begged some of those future decisions, but reduced budget authority $15 billion from the total anticipated for FY 1991 just nine months earlier. In addition, the FY 1991 budget request projected a two percent average annual real decline in budget authority and outlays through FY 1995. Between FY 1991 and FY 1995, defense budget authority would be $158 billion below the expectations of nine months earlier, while outlays would be $93 billion lower.

- On April 26, 1990 Secretary Cheney announced the results of a review of four major aircraft programs for the 1990s. While none were canceled, the production rates for all four were stretched out and the ultimate production run for three of them was reduced. Similar reviews are underway for the Army's LHX helicopter, the Navy's DDG-51 destroyers and SSN-21 submarines and the Strategic Defense Initiative.

- Secretary Cheney also suggested a list of 29 potential base, depot and plant closings early in 1990, close on the heels of the roughly 21 closings already under way as a result of the work of the Base Closings Commission in 1988. While this list may not be final, its timing, the likelihood of significant force reductions in the 1990s and the consolidations which should result from the Defense Management Review all indicate that the U.S. defense infrastructure will shrink in the next decade. (See Table 1)

The Cheney budget projections are, in all likelihood, optimistic. The progress of the defense budget through the Congress this year suggests the probability that budget authority and outlays will both be reduced below the Secretary's request for FY 1991 and will fall significantly below DoD projections for FY 1992 and FY 1995. (See Graph 1 and Table 2) In particular, the Congress appears to be seriously considering a sharp reduction of defense budget authority for FY 1991, which would have an impact on

projected defense hardware budgets through mid-decade.

Having described the down-side of projected defense budgets through mid-decade, let me strike some balance, which is important for your understanding of the likely economic impact of these trends:

- As Graph 1 indicates, the budgetary decline projected by Secretary Cheney would leave defense budget authority in FY 1995 at a level 22 percent above that of FY 1980 in constant dollars. In effect, the DoD would have marched up the hill, and partway back down again. The reductions forecast by Senator Nunn and the House Budget Resolution would leave FY 1995 budget authority, respectively, 10 percent above and three percent below the FY 1980 level in constant dollars.

- Historically, U.S. defense budgets have maintained a peacetime average of roughly $236 billion in constant 1991 dollars. The Nunn proposal would leave FY 1995 budget authority at $255 billion in constant 1991 dollars and the House Budget Resolution would set it at $227 both close to the historic peacetime average.

- Although procurement funding is projected to decline, the proposed Cheney budget remains fairly "hardware heavy" through mid-decade. The aircraft review left all four programs in the projected program plans, though Congress may decide otherwise. Indications are that the other new hardware programs under review are likely to continue in some form. One consequence is that current production programs (M-1, AH-64, F-14D, F-15E) are being ended ahead of schedule, with some near-term impacts on the industry; the next generation may fill some of that gap.

- There appears to be general support for continuing fairly high levels of funding for defense research and development, partly as a way of maintaining the defense technology base and partly as a way of ensuring that we remain on top of the next generation of hardware as a hedge against international change. It is likely that particular attention will be devoted to resources for the earlier stages of defense R&D (basic and exploratory research).

- Although forces will shrink in the 1990s, in part in response to international changes and in part to permit continued investment spending, the United States will continue to support a significant military force. The Army is likely to decline most heavily by mid-decade, perhaps by 5-6 divisions, leaving a force of roughly 12-13 active divisions based largely in the United States and relying considerably on the reserves. It will continue to need a significant, if smaller infrastructure and, though the procurement of heavy equipment is likely to decline, hardware relevant to a lighter force will continue to be procured. The Air Force will also shrink to perhaps 18-20 active duty air wings, also deployed in the United States. With major responsibilities for airlift, redeployment and power projection, the Air Force will require a significant infrastructure and will continue to procure next generation aircraft, though at slower rates and in lower numbers. The Navy, linked less to the European mission, will have significant responsibilities for sea lane control and power projection. While it may decline by two battle groups and roughly 100 ships, it will remain at roughly 12 battle groups and 450 ships. The existing U.S. naval infrastructure is likely to remain (some home port plans will disappear) and slower procurement of new hardware will continue. Finally, strategic forces will decline slowly, with manned bomber procurement likely to be trimmed, while ICBM and SLBM programs will continue. Although these forces will be smaller, the reductions do not represent a "For Sale" sign over U.S. defense capabilities.

## The Impact of Budget Changes on the Economy

Our ability to handle the coming defense transition may be greater than some think, though it will depend greatly on the overall health of the American economy. Defense spending is simply too small a share of major economic aggregates for changes of the size being proposed to determine the direction of macroeconomic activity. The serious question concerns our ability to handle the changes at the microeconomic level: industries, states and communities and their workforces. Here, too, our ability to cope may be greater than we sometimes fear. Most important, we face a major challenge with respect to future U.S. public and private sector policy on high technology (defense and non-defense). Our response to this challenge may determine both the survival of a healthy defense technology base and the success of U.S. industry in international markets in the 21st century.

### Macroeconomic Impacts

The coming defense transition is not likely to have a major impact on the U.S. economy at the macroeconomic level. Defense spending consumes too small a share of U.S. GNP (roughly 5.5 percent in FY 1990) for a shift of even five percent real per year to have a determining impact on the direction of overall economic activity.

Over the past 40 years, peacetime defense spending has declined as a share of overall economic activity and defense-related employment. (See Graphs 2 and 3) In a recent, exhaustive review of research on the impact of defense on the macroeconomy, the Defense Budget Project concluded that defense spending is neither a major source of U.S. economic problems (investment, productivity, competitiveness), nor a major source of its successes (growth, invention).

Defense spending does not appear to have siphoned investment capital out of the economy, nor has it drained the available supply of research capital or talent. The investment share of GNP has not varied inversely to the defense share. In particular, the decline in the defense share does not appear to have stimulated any resulting surge in investment activity, which suggests that other factors play a stronger role in determining investment. Moreover, while defense activities do employ a large number of scientists, engineers and technicians, National Academy of Engineering data indicate that they do not surpass 20 percent of the total supply of such personnel and that this share has fallen significantly since 1972 as a result of growth in the supply of such talent.

In addition, while the United States devotes a larger share of its GNP to defense R&D than does Japan, the historical record does not show that this has been a critical determinant of the relative economic performance of the two countries. Instead, non-defense public and private sector policies, wage differences, relative positions in the economy and a general "catch up" phenomenon may go much further in explaining the differences. This is not to say that the U.S. does not face a capable competitor in Japan, nor does it justify complacency. It does suggest, however, that we should not look to changes in defense spending as a magic solution to our economic problems, which need to be addressed more broadly.

Our conclusion about the relatively minor macroeconomic impact of defense spending changes is, in large part, consistent with other research and testimony on the subject in recent months, whether from the banking community, the Federal Reserve Board or the Brookings Institution. It has been suggested, however, that the emerging "peace dividend" may have a healthy impact on the economy of the 1990s. In comparative historical terms, the relative size of this "dividend" is likely to be small. (See Table 3) Compared with historical experience, the build down of 1986-95 will be smaller and more gradual, shifting between 2.3 percent and 3.0 percent of U.S. GNP out of defense, depending on whether one uses the Cheney or the House Budget Resolution projections.

The existence of such a shift does raise questions about federal spending priorities. Whatever the size of the dividend, it is likely to be overwhelmed by competing demands. Some seek greater deficit reduction, in the expectation that lower interest rates will result. Others seek significant increases in funding for drugs, nuclear cleanup, savings and loan bailouts, which may require considerably more funds than are available. Other priorities will also weigh in -- infrastructure, technology, health, education, children's programs -- increasing the demand. It is not our place to set priorities among these uses, but to suggest that they are probably significantly greater than whatever funds may be available due to declining defense budgets and priorities will need to be set among them. These priorities established at the federal level will, in turn, determine the impact of alternative spending on the economy.

Microeconomic Impacts

If the macroeconomic impacts of the transition are likely to be relatively small, the same may not be true at the microeconomic level. The questions the subcommittee has posed are especially relevant at this level: how will industry handle the decline in procurement; can communities cope with the transition; what are the impacts on the workforce; what federal policies may be needed beyond current capabilities to handle these impacts?

It is important not to minimize the potential for dislocation due to the changes that are likely to occur in the 1990s. Decisions to terminate hardware programs or close defense installations will have specific impacts on firms, communities and workers. Some are feeling the effects already, as contractors have anticipated lower spending in the 1990s and have begun to adjust accordingly. It is equally important, however, to keep these changes in perspective and to set them in context, in order not to overstate their effect and to define public and private sector responses carefully.

Industry Impacts

The impact of these coming transitions will be uneven in the defense industry, driven by the industry backlog, which future systems are affected, alternative federal and private sector purchasing and the nature of the firm in question. In the first place, there remains a $254 billion backlog of appropriated but unspent funds from prior budget years, more than 80 percent of which is for defense investments (procurement, RDT&E, military construction and family housing). This backlog provides a number of defense contracting firms with several years' cushion while already committed work is completed.

Second, as I have already noted, projected defense budgets, though declining, continue to be "procurement and R&D heavy." The slope of the procurement decline will put pressure on some, but not all future hardware programs. Defense R&D funding is also likely to remain at fairly high levels. Moreover, for some contracting firms rising budgets at the Department of Energy and NASA, though they may not replace defense cuts, provide new business opportunities.

Declining defense budgets will have impacts on companies in the industry, however. The sectors of manufacturing in which these impacts may be felt are indicated on Table 4. Some of these are heavily involved in defense research and production, though one can already see the impact of the transition for some of the more important sectors, such as aircraft, aircraft engines, and communications. Here the defense share of total output has already begun to decline since 1985.

Sectoral data is less revealing than the impact defense changes will have on specific defense contracting firms. Independently of which specific systems are affected by declining budgets, the capability of defense firms to cope with that impact is dependent on the nature of each firm, the flexibility of its management, the degree of its

diversification, the dual-use capabilities of its technologies and the alternative markets for its products.

Not all defense firms are alike; in fact, in examining the vulnerability and adaptability of these companies, it is important to recognize their diversity. Let me suggest one way of classifying these companies, which will indicate the flexibility with which they may be able to respond to the coming transition:

Defense Dependent Majors: These firms, such as McDonnell-Douglas Grumman, Northrop, Lockheed, General Dynamics, and Martin Marietta, rely on the Defense Department for more than two-thirds of their sales. For some, the transition may be bumpy, especially those such as Northrop and Grumman who rely on relatively few hardware programs with uncertain futures. Even with this group, however, the nature of the transition may vary. Some dependent majors, such as Martin Marietta, feel they have defined an appropriate market niche and will survive in the smaller defense market. Others, such as General Dynamics, are diversified; a change in one part of the business may not mean overall corporate problems. Still others, such as Lockheed and McDonnell-Douglas, are in the process of diversification, which may, in McDonnell-Douglas' case, lead to a substantial increase in commercial aircraft sales. Others, such as Grumman, may decide that the defense market has changed in a way that requires downsizing or relocation of corporate activity. It is worth noting that dependent majors have not generally been successful in diversifying into non-defense business and that some of them currently have heavy debt loads which may make diversification planning difficult.

Diversified Major Contractors: Another segment includes large contractors which already have significant non-defense business and depend on defense for 50 percent or less of their sales, such as United Technologies, Boeing, Rockwell, Litton, Tenneco, Raytheon, or Allied Signal. These companies have, in most cases, a proven track record for managing commercial businesses successfully, though some tend to segregate defense from commercial business (less true for aircraft engine producers or components manufacturers and more true for shipyard companies, for example). As a result, these companies are likely to have a greater flexibility in coping with the transition and are likely to do so through greater diversification, acquisition, downsizing of defense activities, continued pursuit of defense market niches and the exploration of international markets and collaborators for their technologies. This latter trend is already apparent in Boeing's collaboration with Japanese partners in commercial aircraft work and United Technologies' involvement with a consortium of companies working on future jet aircraft engines for the Japanese defense market.

Low Dependency Majors: Another group consists of contractors doing 20 percent or less of their sales in defense, though they remain major contractors: AT&T, General Electric, General Motors, Ford, Westinghouse, Honeywell. By-and-large, these are commercial contractors which maintain defense divisions. Management flexibility in terms of the defense transition is even greater in this group and responses will include diversification within the defense division (such as Westinghouse's Electronic Systems Group), development or expansion of commercial technologies (General Electric), the sale (Ford) or downsizing of the defense activities. A fairly large number of firms in this group have defense assets up for sale, leaving some uncertainty about the transition for those assets.

Marketing Majors: Other firms sell to the defense market products that are basically commercial: computers, construction services, petroleum products, airline seats, etc. For these, defense sales are less crucial, albeit significant to the DoD. A declining business base in defense should lead to a changed marketing strategy by the firm. Counter to this trend, however, if the Defense Department increases its acquisition of commercial products (as opposed to specifically military products of a similar type), these firms may continue to do significant defense sales.

Small Business Contractors: The industrial segment about which the least is known is the small business prime contracting and subcontracting network. This may be the segment of greatest concern to federal, state and local governments. Heavily defense-dependent small businesses, with short term prime contracts or subcontracts and low profit margins could be vulnerable in the transition, especially as large prime contractors pull business back into the parent firm. A recent survey by the State of Maryland's Department of Economic and Employment Development expresses concern about this segment of the industry in that state. A 1989 survey commissioned by the State of Ohio suggests, however, that some of these firms may be better positioned than one imagines. While the Ohio firms surveyed had relatively thin profit margins and short term defense contracts, they were considerably more diversified than one might expect (65 percent received 50 percent or less of their profits from defense), and had been experimenting further with diversification in recent years. Moreover, there is some indication that many firms at this level of the defense market have significantly more overlap between their defense and non-defense work than do many major contractors. Harvard researcher Lewis Branscomb testified to the House Armed Services Committee in March 1990 that smaller defense contractors tend to be more capable of "dual use" work, since "they do not as often separate their defense and civil R&D into arms-length businesses."

Reflecting this diversity, industry responses to the transition will vary. Some firms will find their niches and stay in the defense market; others will sell their defense holdings if they can; still others will diversify by acquisition or internal product development, seek other government work in expanding markets, merge and consolidate, develop team ventures, or seek international collaborators or markets for their products. A panoply of strategies is available to the industry. It is important to recognize that a significant responsibility for the transition should properly rest with the companies, which are, on the whole, more flexible and diversified than is sometimes thought.

Federal policy toward defense industry adjustment should above all be flexible, focusing on information gathering and dissemination with respect to industry activities and strategies for managing change. (I will say more below about federal technology policy, which is also important for the industry.) Federal mandating of specific corporate responses and exclusion of others is, in my judgement, inappropriate. One small Long Island contractor, Frisby Airborne Hydraulics, has underlined this distinction with respect to the transition for defense contractors. Frisby has successfully diversified its business from defense to commercial markets. In part this was relatively easy because the product and its market were quite similar in the defense and non-defense segments of the aircraft industry to which Frisby sells. In part, the diversification flowed from a successful strategy by corporate management and labor involvement. But the CEO of Frisby was firm about one point in his March 1990 testimony to the Joint Economic Committee: "The government's role in this effort should be that of a facilitator. True conversion will not occur as a result of laws mandating conversion." Such laws, he noted, should not be passed "in any form."

Communities

Defense procurement and basing decisions have an impact in the community context. The affected community (and the state) have a critical role to play in the adjustment to such decision. The ability of communities to adjust is linked to on its dependence on defense activity, the condition of the local economy and labor market and the existence of policy tools (state, local and federal) to assist in the transition.

Discussion and media coverage of the impact of defense decisions generally focus on the communities which are heavily dependent on defense plants or installations. There remain communities in the United States which depend on one defense plant or

base, as there are communities which depend on farming or steel or automobiles. The drama of dislocation, when it occurs, is disheartening and, as a nation, we have not always dealt well with such events, though they occur with regularity.

Each such dislocation needs to be set in context, however, in order to understand the potential impact it could have at the community level. At the Defense Budget Project, we are currently gathering data on the role os defense spending at the state and local level. While good, consistent time series data are not easily available, preliminary indications may reveal substantially lower dependency on defense spending than is often feared. As Table 5 indicates, the importance of defense spending varies greatly from state to state, with the maximum figure being 10.8 percent of Virginia state product in 1989. Most states fall well below this level, with 32 of them at or below a six percent share of state output.

Time series data and anecdotal evidence suggest that these numbers are substantially below what they were 20 years ago. The best data cover California. The Bank of America and the State Commission on Finance recently concluded that, although defense spending and employment in the state were both considerable ($55 billion a year and roughly 600,000 jobs), its impact on overall state economic activity had fallen by nearly 40 percent since 1970 to approximately eight percent of gross state output. (See Table 6) In the Bank's judgement, a real decline of five percent per year in defense spending would "have a far smaller effect on the state's economy than did the winding down of the Viet Nam War," and "the state should be able to absorb the loss in defense-related jobs without much difficulty."

A similar diversification appears to have taken place in other states with significant defense spending, such as New York, Texas, Florida, Connecticut, and Virginia. Not surprisingly, this is also true of may sub-state regions and communities with large contracting activity, including Sunnyvale and Los Angeles, Seattle, Ft. Worth, and Long Island. This does not mean that defense cutbacks will have not impact on these state and local economies, but, rather, that the impact could well be less and the local ability to absorb the change greater than feared.

It is important to examine the community impacts case-by-case, rather than generalize. For some, such as Palmdale, Groton/New London, or Lima, Ohio, the local economic diversification may be at a lower level, and a termination of production may have more severe effects. For each community, an inventory of its local economy and labor market is a critical first step in anticipating the potential impact of spending declines.

The other ingredient of community adjustment is the existence of state and local structures, policies and funding for local economic development and job retraining. Here, too, available evidence suggests that many states -- e.g., Michigan, New York and California -- have significantly stronger state and local economic development and retraining programs than existed twenty years ago. These capabilities are generally not tied to defense dislocations; often they grew out of the decline in federal revenue sharing in the 1970s, the need to respond to the industrial decline of the late 1970s and the termination of many federal economic development programs in the 1980s. While the level of this institutional development is uneven among the states, those with active agencies and programs may provide models for states less institutionally prepared to cope with the defense transition.

Given the limitations on federal programs and resources for economic development and retraining, states and localities have a critical role to play in the next decade. They are best situated to deal with the transition, since they best understand the nature of their economies and the needs of the affected localities. From the state and

local perspective, early notification and information about defense changes are a crucial ingredient of their ability to respond. State surveys in Florida, Ohio and Maryland are already developing data bases on the kinds of problems firms and communities might face. States and localities have an important role in facilitating access for small businesses to information on public resources (e.g, SBIR funding) and private market opportunities (through hosting conferences and meetings with out-of-state businesses which can provide alternative markets). States such as Ohio, Florida and New York have already begun to establish such networks of communication and access.

The federal government can and should play a role in the adjustment effort, with the community as a central focus. Initially, this role involves anticipating budget changes, investigating their likely regional and local impact, and facilitating community responses and access to federal programs. This role can be based on existing institutions, though it is likely to require additional funding. A particularly useful function has been performed over the past 25 years by the Defense Department's Office of Economic Adjustment. With small resources and staff, this office has helped more than 100 communities with the process of adjusting to base closings, with increased local employment in the activities which replaced the base. While OEA cannot and should not be a substitute for local efforts, it can and should be empowered, with increased resources, to play a role in facilitating community/industry/labor communication and planning, once an adjustment question has arisen. Because the Defense Department must be involved in this transition, it is important, moreover, that OEA stay located in the Department itself.

In addition, Congress should consider increasing the resources of the Economic Development Administration in the Department of Commerce in order to deal with defense community impacts and development assistance. Over the years, EDA has played an effective role in supporting community economic development planning which can attract industries that diversify the community's economic base. Despite nearly 10 years of administration efforts to terminate this program, in our judgement, it should be continued and be better funded than it is today.

The community approach to the transition cannot be mandated from Washington, only facilitated. Flexibility at the local level is key to successful transition; no two communities are alike. In some cases, a reuse of the defense installation or plant may be the appropriate approach; in others, the closing of the facility may be the best route; in others, the diversification of the economy may be the right path. A mandated solution from Washington is inadvisable; a catalytic role for the federal government may be critical.

Workforce

The impact of defense cutbacks is already being felt in the workforce, with layoffs most recently announced at Lockheed in California and Georgia and at General Electric in Pennsylvania. The human consequences of these layoffs are real and the federal government has not always responded effectively to them. In defense, as in other areas of the economy, federal policy on human resources will be critical to the future performance of our national economy.

With respect to the defense labor force, accurate information is crucial. The defense labor force includes a wide variety of skill, wider than sometimes thought, and the impact of the transition will vary enormously, depending on the skill involved, the condition of the labor market for those skills, and the existence of adequate retraining and job search support. While there are substantial numbers of technical personnel and craft workers employed in defense work, a 1983 study by the Congressional Budget Office found, that 45 percent of the Defense Department and 58 percent of the industry's labor force consisted of less-skilled positions such as sales and clerical workers, assemblers, operatives, service workers and laborers.

The impact of defense spending changes on the labor force depends heavily on the context in which such changes take place. The Bank of America study referred to above, concluded that with a state economy creating 300,000 to 400,000 jobs per year, the loss of 38,000 jobs due to declining defense could probably be absorbed. Local labor markets may absorb workers in similar occupations. In Ohio, for example, the demand for skilled machine tool workers is high; losses of such jobs in defense may be compensate by jobs in non-defense machining markets. In Los Angeles, aircraft assembly workers at Northrop may find the growing Douglas Aircraft commercial backlog provides new job opportunities. In other markets, however, new employment opportunities may not be comparable with respect to skills or wages to the lost jobs in defense.

Better information on the labor market context is crucial to determining appropriate public policy. For example, in the early 1970s, the decline in defense employment coincided with the end of the Apollo space program and a significant decline in commercial aircraft orders, with a devastating impact on the work force. The situation may be different today with a large commercial backlog and rising NASA budgets providing employment opportunities to compete with those being lost in defense. These differences in the labor market, along with the likelihood that defense R&D spending will remain high, may be welcome news with respect to the employment prospects for the technical and engineering parts of the defense labor force.

The first line of defense for the workforce should be at the corporate and local levels. Some contractors have done rather better at dealing with layoffs than others: increased notification, job fairs and support activities, and contractor-funded retraining can go a long way to assisting the transition for an impacted work force. State and local retraining, job search and relocation programs also play an important role in the adjustment.

At the federal level, I would recommend against creating a separate program for defense impacted workers. Rather, it is important to address the dislocation question broadly at the federal level, as we have begun to do with the Jobs Training Partnership Act and subsequent amendments. The health of the American economy cannot afford to ignore the human resource issues of the 1990s; the defense workforce constitutes an important, technologically sophisticated asset. A federal approach should include an increase in JTPA Title III resources, better use of those resources at the state and local levels and much more active use of the Labor Secretary's discretionary funds for demonstration and pilot programs in the defense industry.

Overall Adjustment Policies

To sum up, the public policy response to the coming defense transition should follow these guidelines:

- The state of the national, regional and local economy is key to a successful adjustment. In an unhealthy economy, few adjustments are happy ones; in a healthy economy, success may come as a matter of course. Federal policies which strengthen the economy overall will be critical to the defense transition. I will say more in a moment about one ingredient of such policies which will be especially crucial: federal policy toward technology and research and development.

- Flexibility of approach is a fundamental ingredient of adjustment policy. Beware the magic cure: general prescriptions are misleading analytically and could be counter-productive in practice. The devil is in the details and in the context in which the transition occurs.

- While the public sector has an important role in the adjustment effort, the private sector role may be crucial. In many cases adjustment decisions are best initiated in the private sector, with strong communication links with the public sector.

- While defense is a national problem, economic adjustment is largely local. While the federal government can play an important role as catalyst, information and funding source, local and state resources and activities are crucial to success. Policy tools for economic development and retraining are increasingly effective in many states and localities and are based on a local "feel" the federal government lacks. Strong inter-governmental relations will be part of a successful transition.

- While it is probably inevitable that the Congress singles out defense for adjustment policy efforts, given the current context, a broader policy approach makes sense. This means making every effort to provide defense-impacted workers and communities with access to programs that are available to constituencies affected by a variety of dislocations.

- Warning is critical: the earlier the affected parties know of a pending change, the more effective their adjustment planning will be. Federal legislation should set notification criteria in this area as far in advance as possible.

- Most of the federal-level adjustment policy tools already exist, but will require greater funding. Beware the reinvented wheel. The only exception may be the need for a visible, inter-agency coordinating body in the Executive Office of the President which focuses attention on the potential impacts of the defense transition.

Federal R&D and Technology Policy

Probably the most important contribution the federal government (and the private sector) can make to a successful transition in an era of declining defense budgets would be to address frontally the broad agenda of research, development and technology for the year 2000. Our nation's technological strength is an increasingly central element of our national security. As Admiral Bobby Inman and Daniel Burton put it recently: "In the future, the traditional U.S. approach to foreign policy will have to give more serious consideration to strategic industrial issues, such as the strength of the American manufacturing base and the leverage of key technologies across industries."

Given our large public sector investment in defense technologies and the even more rapid growth in private sector, non-defense R&D, the defense, civil and commercial aspects of technology and R&D policy are increasingly inseparable. Our national debate over R&D and technology has simply not caught up with this reality. It is not my intention to address all the problems in this arena, but, rather, to highlight a few of them and point out that federal and private sector progress in solving these problems will make a greater contribution than will addressing local adjustment needs to ensuring a healthy defense industrial base and strong, competitive U.S. high technology research and manufacturing in the 21st Century.

- Unidimensional descriptions of the relationship between defense and non-defense research and technology fail to capture its real complexity. Some defense research and technology appears to have little direct implication for commercial work (particle beam research); some has enormous implications (aircraft engines, computers, composite materials, fibre optics). Even these cases are imperfect, for the payoff of a defense investment may be real, but as yet undiscovered. Some defense technologies may be ahead of the commercial curve (composite materials), while the commercial sector may be increasingly ahead of defense with

respect to others (semiconductors). The flow of technological discovery is often mysterious and clearly can move in both directions between military and commercial activities.

• Over time, companies and the Defense Department have erected barriers to this flow, barriers which will hamper the ability of the U.S. high technology sector to compete internationally in the 21st century. Lowering those barriers is important, moreover, to the health of the defense technology base in an era of declining defense budgets, as the Defense Science Board has recently concluded. The Defense Department and federal agencies with technology responsibilities such as the Department of Commerce and the National Science Foundation need to address this relationship as a priority matter.

• In the defense arena, dealing with this relationship means addressing several important policy issues:

- the importance of maintaining a high level of defense R&D, as a hedge and as a means of maintaining a healthy defense technology base.

- the impact of military specifications and contracting policies which erect barriers to the flow of technology between defense, civil and commercial applications.

- the role such agencies as DARPA should have with respect to dual-use implications of advanced military technologies and the active encouragement of a healthy defense technology base.

- the role and adequacy of early-stage R&D funding for basic research and exploratory development, as against giving funding priority to full scale engineering on military hardware. (DoD funding for these early levels of research fell from 16.8 percent of total RDT&E in FY 1980 to nine percent in FY 1990, and declined three percent in constant dollars over the same period.)

- the role that Independent Research and Development (IR&D) funding should play in encouraging contractors to explore the commercial applications of defense-related technologies.

- the determination, as this subcommittee has encouraged, of which technologies and technological capabilities may be critical to national security (broadly defined) and decisions as to appropriate levels of investment in those technologies.

- the need for working interaction and cooperation with non-defense departments of the federal government responsible for technology and research, in order to maximize the dual use of defense technologies.

Although it has an important role to play, moreover, the Defense Department should, in my judgement, not be seen as the lead agency in federal research and technology policy. In fact, given the extent to which commercial technologies are rapidly becoming more important than defense technology on a global basis, it is critical for the federal government to address broader, national objectives in this area. This discussion needs to review funding levels and incentives for non-defense commercial technology development, the roles of such agencies as the National Institute on Standards and Technology, NSF and other federal departments in this area, and the importance of federal market for private sector technology development.

Although these issues are often controversial, it is important to remember that the federal government has always played an important role in the development of U.S. industry and technology, through the military, through support for communications, agriculture and commercial aviation, and in many other ways. For years, we have had industrial and technological policies, but little coherent strategy connecting those policies. It is not a question of whether the federal government has a role, it is one of how consciously we should define that role and how it should be implemented in partnership with the private sector. In my judgement, this subcommittee will have gone a long way to dealing with the defense transition of the 1990s if it addresses these issues.

TABLE 1

Bases, Depots, and Plants Closed Under the Commission List of 1988* and Proposed for Closure Under Secretary Cheney's List of 1990.

| State | Ongoing Commission Closings* | Proposed Cheney Closings |
|---|---|---|
| Alabama | 1 | 1 |
| Arizona | 1 | 0 |
| Arkansas | 0 | 1 |
| California | 5 | 11 |
| Florida | 1 | 0 |
| Georgia | 0 | 1 |
| Hawaii | 1 | 0 |
| Illinois | 2 | 0 |
| Indiana | 1 | 1 |
| Kansas | 0 | 1 |
| Kentucky | 1 | 1 |
| Massachusetts | 1 | 1 |
| Maryland | 1 | 0 |
| Michigan | 1 | 2 |
| Mississippi | 0 | 1 |
| New Hampshire | 1 | 0 |
| New Jersey | 1 | 0 |
| New Mexico | 1 | 0 |
| New York | 1 | 0 |
| Ohio | 0 | 1 |
| Pennsylvania | 0 | 2 |
| South Carolina | 0 | 1 |
| Texas | 0 | 4 |
| Virginia | 1 | 0 |
| Total | 21 | 29 |

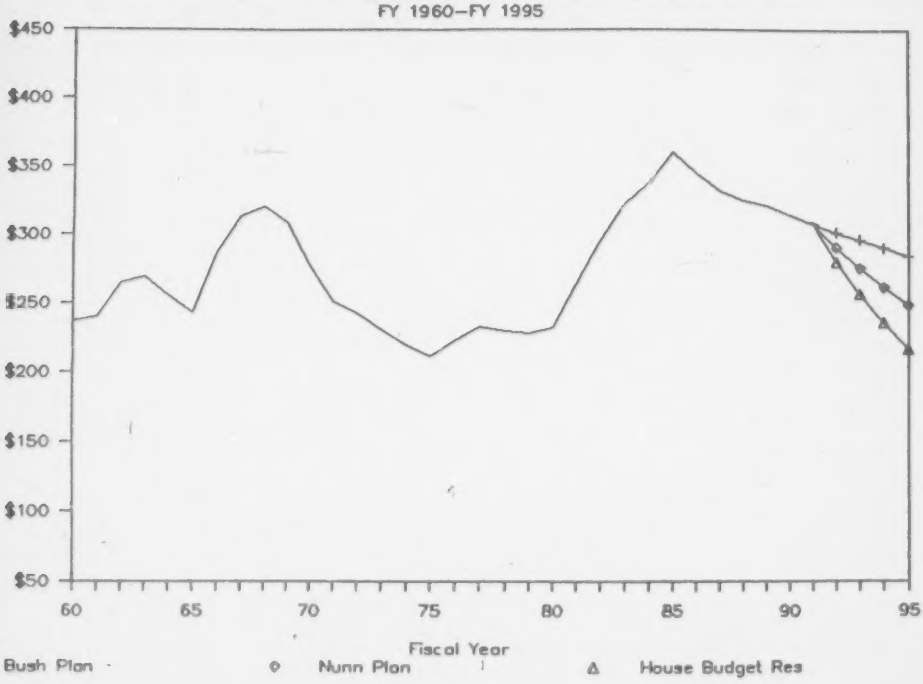
* Does not include closure of stand alone housing installations.

GRAPH 1

FY 1991 Billions

DEFENSE BA UNDER THREE SCENARIOS

FY 1960–FY 1995




SOURCE: Defense Budget Project, based on CBO, OMB, Senator Nunn, and the House Budget Committee.

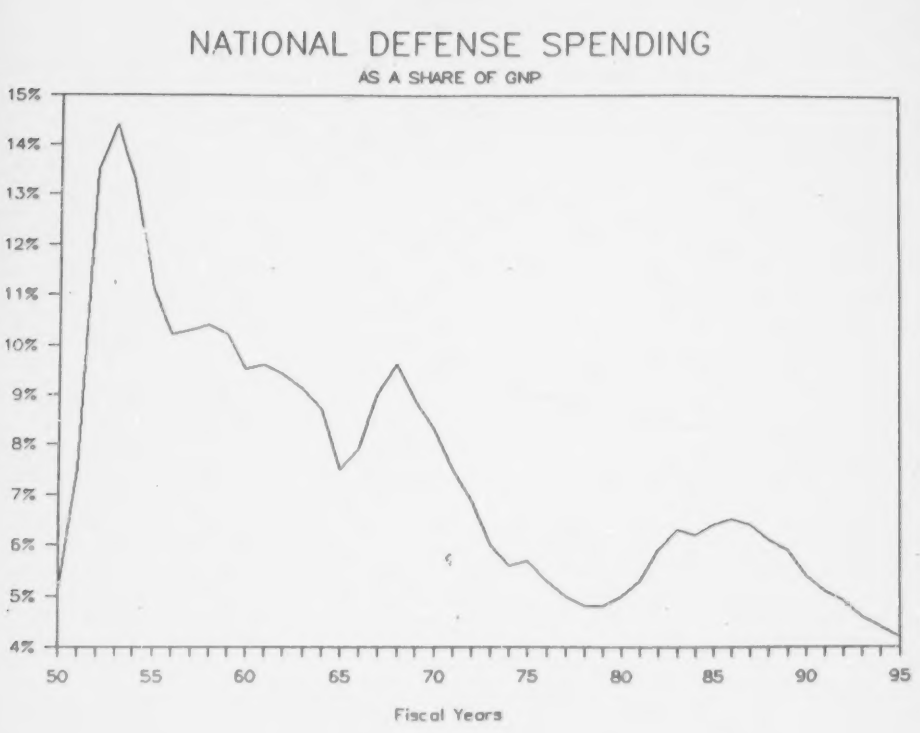
## TABLE 2

**DEFENSE BUDGET AUTHORITY AND OUTLAYS, FY 1991 TO FY 1995, UNDER DIFFERENT SCENARIOS (current billions)**

| | Budget Authority | Cut From Baseline | Percent Cut | Outlays | Cut From Baseline | Percent Cut |
|---|---|---|---|---|---|---|
| CBO Baseline | 1,711 | | | 1,653 | | |
| Bush Administration | 1,584 | 127 | 7% | 1,564 | 89 | 5% |
| Senator Nunn | 1,471 | 240 | 14% | 1,468 | 185 | 11% |
| House Budget Resolution | 1,375 | 336 | 20% | 1,402 | 251 | 15% |

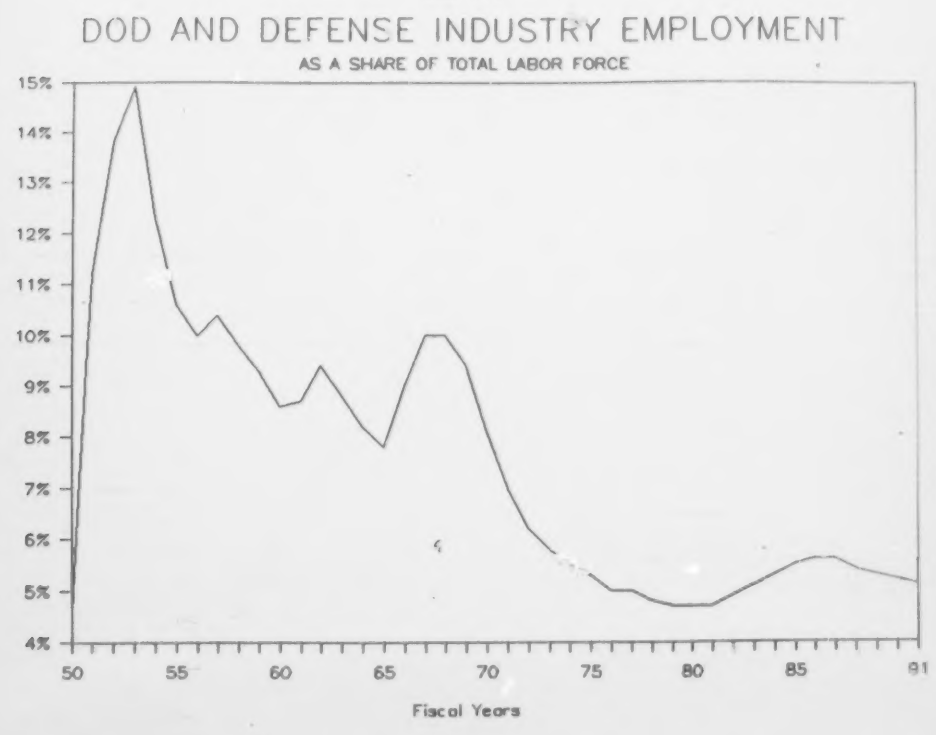
DEFENSE BUDGET PROJECT, based on data from CBO, OMB, Senator Nunn, and the House Budget Committee.

GRAPH 2




SOURCE: Defense Budget Project, Based on DoD Comptroller.

GRAPH 3




SOURCE: Defense Budget Project, based on DoD Comptroller.

## TABLE 3

**DEFENSE SPENDING AS A SHARE OF GNP FOLLOWING THE PEAK YEARS OF WORLD WAR II, THE KOREAN AND VIETNAM WARS, AND THE REAGAN BUILDUP (under various scenarios)**

| | | | | Change | | |
|---|---|---|---|---|---|---|
| | Base Year | Base Yr Plus 4 | Base Yr Plus 9 | Base Yr Thru Yr 4 | Base Yr Thru Yr 9 | Yr 4 Thru Yr 9 |
| Base Year | | | | | | |
| 1944 | 39.2% | 3.7% | 14.4% | -35.5% | -24.8% | 10.7% |
| 1953 | 14.4% | 10.3% | 9.1% | -4.1% | -5.3% | -1.2% |
| 1968 | 9.6% | 6.9% | 5.0% | -2.7% | -4.6% | -1.9% |
| 1986 (CBO Baseline) | | 5.4% | 4.7% | | | -0.7% |
| 1986 (Bush) | 6.5% | 5.4% | 4.2% | -1.1% | -2.3% | -1.1% |
| 1986 (Nunn) | 6.5% | 5.4% | 3.8% | -1.1% | -2.7% | -1.5% |
| 1986 (House Budget) | 6.5% | 5.4% | 3.5% | -1.1% | -3.0% | -1.8% |

DEFENSE BUDGET PROJECT, based on data from CBO, OMB, Senator Nunn, and the House Budget Committee.

# TABLE 4

## Defense Output for Selected Industries
(Sectors with declining defense share of output 1985-1988)

| Industry | Defense Share of Output 1977 | 1980 | 1985 | 1988 |
|---|---|---|---|---|
| Shipbuilding | 45% | 61% | 93% | 100% |
| Ordnance | 61% | 79% | 86% | 94% |
| Large ammunition | 65% | 88% | 88% | 88% |
| Tanks | 40% | 68% | 69% | 72% |
| Missiles | 67% | 69% | 84% | 72% |
| Aircraft engines | 47% | 44% | 78% | 66% |
| Explosives | 36% | 41% | 65% | 65% |
| Aircraft | 43% | 37% | 66% | 53% |
| Turbines | 5% | 7% | 23% | 51% |
| Small arms | 20% | 26% | 48% | 47% |
| Small ammunition | 37% | 30% | 39% | 43% |
| Communications equipment | 35% | 42% | 50% | 42% |
| Aircraft & missile parts | 38% | 31% | 41% | 36% |
| Machine tools | 3% | 8% | 34% | 33% |
| Nonferrous forgings | 21% | 12% | 25% | 27% |
| Truck trailers | 5% | 10% | 29% | 27% |
| Transmission equipment | 5% | 10% | 24% | 26% |
| Electronic components | 15% | 16% | 20% | 25% |
| Engineering instruments | 19% | 23% | 28% | 24% |

Source: Defense Budget Project, based on published and unpublished Dept. of Commerce data.

TABLE 5

Output by State: 1989 (billions of dollars)

| | Defense | Nondefense | Defense Share |
|---|---|---|---|
| AL | 7.6 | 115.4 | 6.2% |
| AK | 1.7 | 15.6 | 9.8% |
| AZ | 7.5 | 109.4 | 6.4% |
| AR | 3.5 | 74.4 | 4.5% |
| CA | 90.1 | 922.0 | 8.9% |
| CO | 7.6 | 127.0 | 5.6% |
| CT | 12.6 | 132.4 | 8.7% |
| DE | 1.4 | 32.2 | 4.2% |
| DC | 3.3 | 48.2 | 6.4% |
| FL | 22.9 | 374.9 | 5.8% |
| GA | 13.1 | 221.5 | 5.6% |
| HI | 3.6 | 34.1 | 9.5% |
| ID | 1.1 | 29.9 | 3.5% |
| IL | 16.6 | 399.3 | 4.0% |
| IN | 11.1 | 188.6 | 5.6% |
| IA | 3.4 | 91.9 | 3.6% |
| KS | 6.2 | 81.1 | 7.1% |
| KY | 4.9 | 101.6 | 4.6% |
| LA | 7.2 | 126.6 | 5.4% |
| ME | 2.7 | 35.6 | 7.0% |
| MD | 14.2 | 149.0 | 8.7% |
| MA | 17.7 | 227.5 | 7.2% |
| MI | 13.2 | 327.2 | 3.9% |
| MN | 7.6 | 156.4 | 4.6% |
| MS | 5.7 | 63.6 | 8.2% |
| MO | 13.4 | 173.3 | 7.2% |
| MT | 0.8 | 21.1 | 3.7% |
| NE | 2.3 | 53.5 | 4.1% |
| NV | 1.4 | 33.6 | 4.0% |
| NH | 2.6 | 39.4 | 6.2% |
| NJ | 15.5 | 288.7 | 5.1% |
| NM | 2.8 | 39.1 | 6.7% |
| NY | 40.7 | 617.6 | 6.2% |
| NC | 11.1 | 242.0 | 4.4% |
| ND | 0.8 | 17.7 | 4.3% |
| OH | 19.7 | 373.7 | 5.0% |
| OK | 5.4 | 91.3 | 5.6% |
| OR | 3.0 | 83.4 | 3.5% |
| PA | 20.2 | 391.7 | 4.9% |
| RI | 2.1 | 33.2 | 5.9% |
| SC | 7.0 | 109.7 | 6.0% |
| SD | 0.8 | 21.4 | 3.6% |
| TN | 6.9 | 157.9 | 4.2% |
| TX | 34.8 | 577.8 | 5.7% |
| UT | 3.5 | 51.2 | 6.4% |
| VT | 1.0 | 17.4 | 5.4% |
| VA | 25.0 | 205.9 | 10.8% |
| WA | 14.1 | 131.6 | 9.7% |
| WV | 1.6 | 42.6 | 3.6% |
| WI | 6.7 | 173.3 | 3.7% |
| WY | 0.7 | 16.2 | 4.1% |

Source: Washington Analysis Corporation, based on Dept. of Defense data.

TABLE 6

Defense Spending Share of Gross State Product (GSP) in California: 1967–1990
(amounts in constant 1982 dollars)

| Year | Defense Spending | Defense Share of GSP |
|---|---|---|
| 1967 | 35.1 | 14.3% |
| 1968 | 37.5 | 14.6% |
| 1969 | 37.1 | 14.0% |
| 1970 | 34.8 | 13.2% |
| 1971 | 30.5 | 11.5% |
| 1972 | 28.0 | 10.0% |
| 1973 | 25.7 | 8.8% |
| 1974 | 25.0 | 8.4% |
| 1975 | 24.9 | 8.2% |
| 1976 | 24.9 | 7.8% |
| 1977 | 25.7 | 7.6% |
| 1978 | 24.4 | 6.8% |
| 1979 | 24.0 | 6.4% |
| 1980 | 24.9 | 6.6% |
| 1981 | 25.9 | 6.9% |
| 1982 | 29.3 | 7.9% |
| 1983 | 34.0 | 8.7% |
| 1984 | 39.0 | 9.3% |
| 1985 | 42.0 | 9.4% |
| 1986 | 44.0 | 9.5% |
| 1987 | 46.9 | 9.6% |
| 1988 | 48.2 | 9.4% |
| 1989 | 46.3 | 8.8% |
| 1990 | 44.0 | 8.1% |

Source: California Commission on State Finance

Senator BINGAMAN. Thank you very much.

Let me ask a few sort of practical questions from the point of view of this subcommittee and the Armed Services Committee. We, of course, have a few months of time before we are going to be acting on whatever legislation is dealt with this Congress. And the real questions come down to what, if anything, should we be legislating that is helpful, or at least tries to involve the Federal Government, in defense contractor adjustment and community adjustment and worker adjustment.

When it comes to defense contractors and the defense industry generally—let me just be the devil's advocate here a little bit and ask any of you, starting with Jacques Gansler—in my home State we have seen several industries go under the proverbial waves in the last decade.

The uranium mining industry, which was supposed to be a major industry for our State, is essentially defunct now. We have determined that we do not need to have a domestic capability for uranium and therefore there is no uranium mining industry anymore. Now, that has meant a loss of a great many jobs in our State.

Similarly, oil and gas industry has lost about a half of its employment in this decade, in the 1980s. During all of that there were some efforts, but none of them effective, to involve the Federal

Government in trying to soften that, or deal with that, or involve itself.

Why, if we did not involve ourselves in those, why is it more likely, or more probable, or better policy for us to involve ourselves when the defense industry declines substantially?

Dr. Gansler, do you have a point of view on that?

Dr. GANSLER. I think the major point is to look at what the role of the Federal Government should be in terms of things that are critical to the Nation: employment, technology and so forth. It seems to me that, in the case of defense, we have a very unique situation in which the Federal Government is, essentially, 100 percent involved; as contrasted to those sectors where there is a market-based economy.

And yet we have this, I think, opportunity, but it may be viewed as a problem, in that the technology trends today, unlike in the past perhaps as much, are such that you have a merging of the technologies between defense and the civil ones and particularly those that are critical to national productivity.

So you have an opportunity, if properly addressed, to in fact have a positive impact on national productivity with even things like defense R&D dollars.

Now the historical problem has been, as Seymour pointed out, the way defense has done business historically is perverse to normal market forces. It does not emphasize high quality, low cost, rapid cycle times and things like that. It does, fortunately, at least emphasize high performance.

Now, if in fact, the combination of legislation and changes in the way the executive branch, particularly the DOD, operate could be made on the defense sector itself, which is the role of the Government as I see it here, then in fact you would be having a positive effect on the labor force, a positive force on the corporations.

What is wrong today is that you have a negative effect. In other words, if I were going to recommend things that the Government ought to start out by doing, it is removing the things that it has put in which force the Department of Defense to do its business in such a perverse way, things that cause high costs, things that cause long cycle times.

And case studies have been done a number of times—and a number of them are under way now—that highlight what are current barriers, the cost accounting standard problems associated with trying to do commercial business, the military specifications, the procurement problems—practices and problems that we have, and so forth.

One can go through a list of those. Those, I think, should now be addressed by the Federal Government in terms of actions that can be taken to remove those barriers. Then you would be able to take advantage of the productivity, the potential of this high technology sector, for U.S. benefit, not just military benefit.

Senator BINGAMAN. Dr. Melman, did you have a statement on that?

Dr. MELMAN. The very question posed by the Senator, the whole subject matter, illuminates the crossover and intertwining of politics and economics in addressing these matters.

There is a broadening understanding right now that following the termination of the long Cold War military political contest, the security of the United States is increasingly controlled by its economic competence.

That is why various colleagues have come to the wry judgment that the victors of the Cold War are Germany and Japan, for by the criteria of economic competence, those are now world leaders in technology innovation in the world trade in machinery and new means of production. Those are the countries that are now the lead—the leaders in showing how government can be used to encourage civilian economic development of every sort.

Here we are enmeshed in the problem of what to do to facilitate a conversion from military to civilian work in the factories, bases and laboratories. The members are justifiably concerned about the perceived local consequence in the districts and States. But often that concern seeks to avoid the hard issue, that local authority is the technically and organizationally optimum way to do planning for such conversion operations.

And that is the meaning of the strategic role of alternative use committees as a requirement for continued work for the Pentagon, as a requirement for continued operation of bases and laboratories.

Consider, for example, that at the present time, for the 2 years past, there had been an economic conversion law in place that required the operation of alternative use committees in the bases, factories and laboratories. Then by now in each of these places, there would be a serious equipment to respond for a change in Pentagon orders or even a termination of contract.

There would be a file drawer that could be pulled, and the first folder would say, week one. And there would be a carefully thought-through specification of steps to be taken then and in the subsequent periods for an orderly changeover.

But that is opposed. That orientation is opposed. It is opposed in the United States by the top managers of military industry establishments. It is opposed by the Department of Defense directorate. It is opposed by the White House. The Department of Defense directorate and the White House from 1961 to the present day have consistently opposed alternative use planning in the bases, laboratories and factories serving the Pentagon.

Since this is clearly a political economic matter, it should be of proper interest to the members of this committee and, indeed, to all the Members of the House and the Senate, that in the Soviet Union at the present time a committee of the Supreme Soviet is attempting to formulate conversion legislation there.

And when the idea of local decentralized alternative use planning is set forth, it is opposed by the top managers of their military industry establishments. It is opposed by the directorates of their military-serving ministries. It is opposed by the state planning commission.

Every reason that serves to explain the defective qualities of the present Soviet economy is a reason for giving attention to the obverse of centralism, of giving emphasis to strategic way of inducing fully competent local responsibility and authority.

Senator BINGAMAN. Thank you very much.

My time is expired, but let me give Dr. Adams a chance to respond briefly before I defer to Senator Riegle.

Dr. ADAMS. Just three quick points, Senator, in response to your question.

One is, we have had industrial policy in this country. I think by and large we do in fact have, I think, rather disorderly and not terribly well coordinated and at times not very effective mechanisms for dealing with transitions in industry. And we have industrial policies at the Federal Government level that deal with build-up of industries for years. Aircraft, nuclear power, agriculture, radio; one can go historically through the record.

Second, as I suggested, we do not always do those adjustments well; we do them badly in many respects. And I think we have an opportunity here to work through a process of dealing with it well.

Third, I would suggest that in this area because, as Jacques Gansler suggested, these assets are so critical to the future of technology and the competitiveness in the American economy, it is important for us to tackle them as an issue of national security priority.

I will point out in addition that this transition has actually been happening. It is not really a disorderly case of everybody running off and doing what they please. But, in fact, over the past 6 months or so various, particularly State and local government instances, have been dealing with this question of adjustment and transition in some detail.

The State of Maryland, which just produced a task group force and released a task force report on the Maryland economy; the State of Washington, which just passed legislation to assist firms with economic diversification; the State of Ohio, which has held a major conference in January and which has undertaken conferencing for small businesses with outside agencies and contractors who can procure their goods in the commercial market; and the State of Florida, which has undertaken an additional and similar kind of process. So there is a process here that is under way.

In a sense it has the vice of being somewhat disorderly. It has the virtue of allowing a thousand flowers to bloom. And as I suggested in my testimony, I think flexibility of approach is absolutely critical.

Dr. MELMAN. May I request permission of the Chair to insert in the record a record of reports of lay-offs in military industry firms, bases and laboratories that have occurred in the recent past and are now projected, that to give the members a more complete picture.

Senator BINGAMAN. That would be very useful. We would be glad to have that. Thank you.

[The information referred to is retained in committee files.]

Senator BINGAMAN. Senator Riegle.

Senator RIEGLE. Thank you very much. Let me say to each of you, I appreciate the tremendous thought and care that has gone into the preparation of the presentations today. I think if we could seat the whole country in this room, or an equivalent place, to take part in this kind of discussion and that which will follow, it would be an enormously valuable public service.

This kind of serious, penetrating discussion of the peace dividend and conversion and how we use it intelligently to build a stronger country—a country that is better able to meet security and domestic needs—is really a central debate that must go on now in our country. You have done much to lay and advance the foundation for that today.

I have two questions that I would like to pose to you for brief comment—I know we have got other witnesses coming—and they are in separate areas. The first one has to do with a comparison with how the United States is doing today in terms of its economic performance in comparison to Japan, Japan having done an exceptional job of figuring out how to drive its economy forward and to make great strides, especially in the last decade.

I might say parenthetically, you can also put Europe 1992 out on the table for comparison, because they are coming forward with a much more integrated effort to produce and enhance their global competitive position, and obviously we are going to feel those pressures to the extent that we have shortfalls in our own performance. For the moment let me just talk about Japan.

If you look at a comparison of how we are doing in terms of our basic, economic system versus how the Japanese are doing in certain key areas, this is what you find. The Japanese have been running a trade surplus with us that approximates $50 billion a year, so on balance they have been extracting scarce capital out of our society at the rate of roughly $50 billion a year. It is a ton of money to be going out of the country and disappearing as U.S.-owned capital is becoming Japanese-owned capital. The figure this year will certainly exceed $40 billion.

I asked the trade representative the other day what the figure might be, and she was not able to give us any kind of a meaningful estimate—a worrisome response, I felt at the time. But in any case, last year the Japanese invested five times the amount of equity capital in their businesses than we managed to do in private businesses here in the United States. Japan had a 5-to-1 advantage in equity capital investment in their businesses.

With respect to civilian research and development last year, the Japanese managed to invest twice what we invested in the United States, if you relate that to the respective size of each of our GNPs.

With respect to the cost of capital in Japan today, it is roughly half what it is in our country. That takes all forms of capital equity and debt as well. Look at the educational level as Dr. Melman mentioned with respect to some of the physical deterioration. If you look at the performance side of American education today, we have got a high school drop-out rate in the country of about 26 percent. The high school drop-out rate in Japan is about 2 percent, so ours in 10 times worse than theirs.

In terms of the most critical measure of fall-out in a society, and that is not even being able to get our young men and women through the high school level of achievement and attainment, it is a stunning, stunning American shortfall and deficiency, and a terrible problem with respect to what the future is apt to look like.

Today in Japan the students there go to school at the high school level, about 240 days a year. Our students go 180 days a year. There are a host of other measures that one might set. I will just

list one other. Last year for the first, time the Japanese economy managed to have more business capital investment in aggregate—even though their GNP is about 60 percent of ours—than we did in the United States.

So they are moving ahead at a tremendous rate of speed. I just take them as one example, because they are the sharpest and clearest example, that is running up these enormous differential bilateral trade surpluses with us.

Now, it seems to me that if we are going to begin to close these gaps of the kinds of measures that I have just described in terms of the shortfalls of our performance, versus this principal international economic competitor, that some significant part of this peace dividend that is now about to be generated has got to make its way into these high leverage investment areas to drive up the productivity and economic growth performance of this country.

It seems to me it is virtually an inescapable conclusion that if you are going to live and survive and thrive, hopefully, in an international, global economy, and you have got these massive differentials in baseline performance that create future income, future wealth and future growth, that now that the Cold War is ending we must take and shift over a major part of these newly available resources into the things that really drive national economies.

I think I am hearing that in different forms and in a manner in what you have each laid out in very comprehensive proposals, but as it relates directly to this international competition, this strategic international race that we are now in, if we are coming out of an arms race, we are clearly in an accelerating, international economic race, and should we not be concluding here that we have got to take a very substantial part of this peace dividend and put it precisely into the areas that can lift the domestic economic performance of this country?

So let me just go right down the table, and I would just like a brief response, if I may, from each of you.

Dr. GANSLER. I think if you look at the basic question of comparing U.S. economic performance today with Japan or even Europe, one argument that of course is the one that we hear frequently is that the United States is ahead, and the reality is that I think economically we are ahead.

The problem with that is that it does not look at the slopes—or the rate of change—of what is taking place, and I think when you look at the rate of change that is taking place you see that we can project forward and see where we are likely to be, particularly in terms of critical technologies, and I would argue that you do not want to look at the total economy.

In terms of the United States, I am much more interested in whether we have an electronics industry in the future than whether we have a hamburger industry, for example. So we need to look at the critical areas, and there I think what you find is, in Europe and in Japan, a positive economic environment in the country—many of the things you mention, from education through finance and so forth—and you find exactly the opposite here in the United States.

Now, when you start to look at the specific subject of this hearing, namely, the defense economy and the defense industrial base, I

think there you see a clearer distinction, particularly in Japan. When Nakasone was Minister of Defense and later when he was Prime Minister, he enunciated a very explicit vision of the defense industry in Japan, which was to be an integrated civil-military sector, and that is the plan, and that is what they are implementing.

So they are using commercial components in their design, they are integrating their factory floors—in a sense, conversion is not the question. It is an integrated sector and therefore competitive on an international basis on the civil side, and I frankly think very competitive on the military side and growingly so in the future.

Now, if you look at the United States and compare it to that, what we have done is increasingly force separation of the military and civilian. It is almost as though that is our policy, except we do not even state it explicitly.

Senator RIEGLE. It sounds to me like we cannot afford that luxury any longer, because we are a little short on resources among other things, so we are going to have to figure out how to go in an integrated fashion, put the pieces of the puzzle together.

I know time is fleeting. Dr. Adams, could I just ask you for a comment?

Dr. ADAMS. I think the Japanese case setting aside some historical variables that explain how the Japanese economy can come from and therefore begin to be a rising economy while ours has been a plateauing economy for a while.

Setting those aside, I think there are probably three things that the Japanese lesson ought to be in a sense for us in terms of our own policy. One is obviously the virtue of the Government-industry relationship, which is something that we tend to throw into a barrel of ideological debate and not really focus on where the Japanese have simply set that ideological argument aside and found ways to coordinate and work together.

Senator RIEGLE. So they have teamwork. They figured out how to have national teamwork?

Dr. ADAMS. Yes. Second, they have the virtue of looking very carefully at all time at the technological crosswalks. What does the technology do here? What will it do there? What is its utility now in military terms? What is its utility in commercial terms? They do not build the barriers.

Third, the human resource investment that you yourself mentioned, which is where I think we are most efficient at this point where when Seymour says we are casting a generation of people to the technological scrap heap, that we have to really turn that policy around and achieve the objective that you want to achieve.

Senator RIEGLE. Dr. Melman.

Dr. MELMAN. Being accorded about 70 percent of the Federal Government's R&D outlays year after year, the automatic consequence has been that the military serving laboratories have effectively trashed important parts of civilian R&D competence in the United States, and that is visible in the disappearance of entire industries as in consumer electronics. It is visible in diminished production competence in what used to be classic American industrial fields like electric power transportation.

So when Boeing-Vertol about a decade ago tried to build electric trolleys, there were a series of catastrophic failures, and these consequences were the result of their applying ordinary aerospace management and engineering technique. The people in Boston got fed up and proceeded to get rid of the Boeing-Vertol trolleys. Boeing-Vertol left that business entirely, and they then bought trolleys from Japan which I note have had twice the mileage before requiring any maintenance as compared to those that came from Boeing-Vertol.

Senator, you have outlined a series of conditions prevailing in the Japanese economy, the obverse of which once—which characterized the U.S. economy at one time such that until the 1970s that set of conditions gave the United States the characteristic of a first rate industrial economy. The deterioration that you summarized is part of a second rate industrial economy, and that is not the end of the matter.

We have yet to examine fully what has happened in the machinery producing industries of the United States and so we find from examination of the census of manufacturers of 1987 compared with that of 1977 that there has been a dramatic decline in production capability, competence, capacity in the machine tool industry, the electrical machinery industry, the construction equipment machinery, the mining equipment machinery, and the industries producing agricultural machinery.

As that kind of deterioration proceeds to the diminution and finally even disappearance of production competence in the United States in these fields, the United States becomes a third rate economy, an underdeveloped country depending on the importation of machinery and technology technique from abroad. That is where the Soviet Union is today, and the United States is moving swiftly in that direction owing to the drain of resources that have gone to the military economy and the cutdown of competence in productivity growth that was once the hallmark of U.S. industrial capability.

But that cutdown in productivity growth is not the fluke of some oddment as some people have said. Thus, it has been charged that the entry of women to the work force has diminished productivity, that the incorporation of black Americans increasingly has diminished productivity, that more Hispanics in the work force has diminished productivity.

All this is quite beside the point. What has diminished productivity very concretely at the factory level is that the relative price of machinery has now been rising more rapidly than wages to workers for the first time in American history because the machinery producers have gone into decay. The machinery producers have themselves become cost maximizing following the essential of the military industry firms.

It is essential to understand that the central problem of the U.S. economy today is not market control, not government action to regulate market demand. We have market demand in machine tools, but half that demand is met from abroad. We have market demand in automobiles, but a third, soon half, is being met from abroad.

We have a market demand for shoes, but 85 percent is being met from abroad. The issue is production competence and that is why this hearing is of crucial importance. And we will not face the

issue unless you get down to asking the question, what is there about the military industrial firms that degrades production competence? And that mechanism is that of the specifications given by the Department of Defense and the mode of relationship between these firms and the Department of Defense. And that is what gives rise to the criticality of locally based and mandated conversion mechanisms.

Mandated does not mean casting doubt on either the integrity or good will of the managers and engineers in these enterprises. It merely notes that the top managers of these firms and their engineers have developed a trained incapacity for civilian work.

The top managers of military industry are magnificently competent in the politics and diplomacy of dealing with the Department of Defense. They could not sell to Sears Roebuck to save their lives. That does not mean any ill will is called for with respect to these men and women. It does say that senior persons who have spent 30-40 years in the service of the military institutions of this country should be acknowledged as having done what they did and should be allowed and honored with proper retirement under proper conditions.

The largest number of managers and engineers can and should be going through occupational retraining to suit their skills to the design work that is needed for civilian products to suit the managers for the internal modes of operation and marketing that is required for civilian products. That is why the specifications found in House Resolution 101 are of central importance as they mandate alternative use committees in the locations and as they mandate occupational retraining for the managers and engineers.

90-291

S.J.R. 192

By: Senator Sanders

Enrolled, S.J.R. 192,

URGING THE PASSAGE OF THE DEFENSE ECONOMIC ADJUSTMENT ACT.

WHEREAS, the U. S. Defense Department's proposal to close Fort McClellan creates an economic crisis for citizens and businesses in the Anniston area similar to that experienced by Selma with the 1977 closing of Craig Air Force Base and by Mobile with the 1964 closing of Brookley Air Force Base; and

WHEREAS, the easing of the cold war provides us the opportunity to begin converting the defense industry into civilian uses, but without proper planning we risk squandering that opportunity; and

WHEREAS, a comprehensive national policy of economic conversion is required to ensure the orderly and efficient transfer of industrial and other resources now being used for military purposes to alternative civilian uses to prevent reductions in the military budget from causing severe economic dislocations, job loss, and economic hardship to tens of thousands of defense workers and military personnel, their families and the communities in which they live; and

WHEREAS, only H. R. 101, the Defense Economic Adjustment Act, sponsored by Representative Ted Weiss (D-NY), contains all the essential components for successful economic conversion from military to civilian production including:

1. The establishment of mandatory, local-based Alternative Use Committees comprised of labor, management, and community representatives at every defense facility with at

least 100 employees to develop detailed plans for converting the facility and re-employing the workforce within two years of losing a military contract or military base.

2. The requirement of one year's notification of plans to cut back or terminate a defense contract or military base in order to ensure enough time to implement alternative use plans.

3. The provision of income and benefit maintenance for laid-off defense employees and economic adjustment funds to assist affected communities during the conversion process.

4. The guarantee of no new taxes to fund this program. All defense contractors will be required to pay into an economic conversion fund at an annual rate of 1 1/4% of gross revenues. In addition the government will pay into the fund 10% of projected savings from the cancellation or reduction of a military program or contract.

BE IT RESOLVED BY THE LEGISLATURE OF ALABAMA, BOTH HOUSES THEREOF CONCURRING, That the Alabama Legislature declares its support for H. R. 101, the Defense Economic Adjustment Act, and urges members of Alabama's delegation to the U. S. Congress to co-sponsor it, vote for it, and in whatever other ways possible, promote its speedy passage.

BE IT FURTHER RESOLVED, That copies of this resolution be delivered to each member of Alabama's delegation to the U. S. Congress.

President and Presiding Officer of the Senate

Speaker of the House of Representatives

S.J.R. 192

Senate 3-28-90
I hereby certify that the within Senate Joint Resolution originated in and was adopted by the Senate.

o McDowell Lee,
Secretary

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House of Representatives
Adopted 4-4-90

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By: Senator Sanders

Senator BINGAMAN. Thank you very much.

We do have another panel which has been waiting very patiently. We need to get on to them. But before we do, let me call on Senator Levin for any statements or questions that he has of this panel.

Senator LEVIN. I will be very brief, Mr. Chairman. And thank you for your leadership here. And Senator Riegle is leading a very important task force, which is going to make a critical contribution here. And we are all very much determined that we are going to facilitate this transfer from military to civilian production.

I would like to just ask this panel one question, because I know you are behind schedule. Could you outline the existing programs which could be enhanced to facilitate the conversion to civilian production, programs either in the Department of Defense or the Department of Labor, or any other department? Could you specifically identify those for us?

I think the Department of Defense, for instance, has an Office of Economic Adjustment. There is a Job Partnership Training Act, which has money for dislocated workers. Go through existing programs, give us their level of funding. Is it adequate for this? What programs can be enhanced?

Dr. ADAMS. I can give you a listing of at least what I know that may be relevant. There are obviously probably 15 or 20 programs that may have relevance here, Senator. You have mentioned the Office of Economic Adjustment in the Defense Department. My estimation in terms of the size of the transition that we may be facing is it is probably underfunded, but has been rather effective with respect to the transitions communities have faced with respect to base closings.

Senator LEVIN. Does it also apply to plant closings?

Dr. ADAMS. It is able to work in communities where plant closures are involved. That is within its legislative mandate. It has not done much of that, but it has done some.

Dr. GANSLER. It has done some in Federal facilities, particularly at munitions plants.

Senator LEVIN. It has the same authority with plant closings as it does with base closings?

Dr. ADAMS. It does not have exactly the same authority with respect to plants, because plants are not publicly owned. Therefore it

cannot deal with plants in that process. Some defense plants are, but others are not.

Senator LEVIN. If you can go briefly, one by one, just for a couple of minutes each, list the most important programs. I am going to get to each of you.

Dr. ADAMS. Second, the Economic Development Administration, as you have mentioned, and the Title IX programs in particular. The Community Development Corporation, The Jobs Training Partnership Act, Title III small business innovation research grants.

Senator LEVIN. The Economic Development Corporation, let me interrupt you.

Dr. ADAMS. It is inadequately funded at this point for that purpose.

Senator LEVIN. Add that, if you would, as to whether it is adequate or inadequate at the end of each.

Dr. ADAMS. The Jobs Training Partnership Act is probably underfunded at this point, and I would say needs a lot of work on its capabilities for handling dislocations, with which its record is somewhat uneven.

Small business innovation research in the small business programs across the country have in fact a fairly good track record of effectiveness. It may need some additional funding.

My sense in general, Senator, is that the institutional capabilities that we need to deal with this transition exist for the most part. They may need greater visibility. They certainly need greater funding.

Senator LEVIN. If you could for the record give us your assessment of what existing programs there are and what funding levels would be needed in order to meet this need it would be helpful. I know there is a difference of opinion as to whether existing institutions and programs are adequate or whether we are going to have to do something significantly different.

I know that this panel is not in agreement on that, but I would like to get the assessment of existing programs. Dr. Gansler.

Dr. GANSLER. I basically agree with Gordon on the five areas, in terms that they have been quite effective in their limited areas. I think the Office of Economic Adjustment, for example, has a very good track record in the closing of facilities. And they have gotten a little bit into government-owned facilities, munitions plants and things like that. Their role is not focused primarily on the industrial side. It is primarily focused on the public side.

The others I think, by and large, have had good success, again, under I think low funding. The SBIR one, I might mention, small business innovation, because there I think there is a change that might help it, and that is that it has tended to be focused almost exclusively on new products, as contrasted to process improvements. And I tend to agree with Seymour's point about the need for the United States to focus much more in the manufacturing area, and process technology I think ought to be encouraged as much as product.

The same thing, by the way, applies to the independent research and development funding that the Defense Department funds. I would encourage that to be more process oriented.

Senator LEVIN. All right, before I call on Dr. Melman, because of the time, if each of the three of you would for the record just send us a piece of paper, list the programs, what changes you would make in authority, in emphasis, in funding, it would be very helpful.

[The following insert was submitted by Dr. Gordon Adams. Dr. Melman and Dr. Gansler did not submit written responses for the record.]

## Federal Programs Applicable to Economic Adjustment

**CORE PROGRAMS:**

**Community Planning and Economic Development Programs:**

1. Office of Economic Adjustment (OEA), Department of Defense (DoD): The Pentagon's Office of Economic Adjustment (OEA) has over 29 years of experience assisting communities in adjusting to defense base and industry realignments. The programs OEA provides are directly applicable to defense-dependent communities. The office provides planning grants to communities and works with them to assess the impacts upon the community, evaluate community needs, identify resource requirements and sources, and prepare development strategies and plans.
*(The Defense Budget Project (DBP) estimates that OEA may require an additional $2.5 million in 1991 to fund grants for communities facing industry related dislocations.)*

2. Economic Development Administration (EDA) Title IX Program, Department of Commerce: EDA's Title IX program for assistance to communities which are feeling the effects of a sudden and severe economic dislocation (SSED) can provide defense impacted communities with direct assistance to help them adjust to economic dislocations. Title IX grants come in two forms: (1) planning grants, and (2) implementation grants.
*(Based upon DBP estimates, EDA's Title IX program may require an additional **$3 million** to assist defense impacted communities in planning adjustment strategies.[1])*

3. EDA Public Works and Development Facilities Program, Dept. of Comm.: EDA's public works program may be one of the most important programs for defense impacted communities to improve their infrastructure and develop and diversify their economies. Grants provided under the public works program will allow communities to develop industrial parks and infrastructure, expand industrial and commercial plants, and enhance educational facilities within the context of an overall adjustment strategy.
*(Based on DBP estimates, the EDA public works program may require an additional $25.5 **million** in funding -- with similar levels from 1992-1995 -- to assist defense impacted communities.)*

4. EDA State and Urban Area Planning Grant (302a) Program, Dept. of Comm.: EDA's State and Urban Area Planning Grant Program (302a grants) can provide both defense impacted states and urban areas with planning grants to assist in formulating and implementing economic adjustment strategies. The 302a grants can provide states with assistance in developing and coordinating a state-wide response to defense dislocations. In addition, 302a grants will assist state governments in coordinating the effective implementation of state and federal adjustment assistance programs.
*(Based upon DBP calculations, in 1991 an additional **$3 million** in funding may be required for the EDA State and Urban Area Planning Grant Program.)*

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[1] Additional funds approximating **$30 million** may be required beginning in 1993 when these communities apply for implementation grants. Anticipating DoD budget cuts of five percent yearly through 1995, additional funding for Title IX may require approximately $3 million in both 1991 and 1992 and $33 million in 1993-95, with requirements of approximately $30 million each in 1996 and 1997.

The above three programs are targeted for termination by the Administration in 1991.[2] These programs do not exhaust the range of applicable EDA assistance programs, and more funding for other EDA programs outlined in the additional programs section below would also help communities adjust to defense-related economic dislocations.

**Workforce Retraining and Employment Programs:**

5. Job Training Partnership Act (JTPA) Title III, Department of Labor (DoL): The Department of Labor's Job Training Partnership Act (JTPA) Title III and its Economic Dislocation and Worker Assistance Act (EDWAA) provisions provide a mechanism for directly assisting defense dislocated workers in obtaining retraining and related employment services through state retraining programs. The program provides grants to states in order to fund training, retraining, job search assistance, job development, supportive services, and relocation assistance. Within JTPA, the Secretary of Labor administers a discretionary fund which allocates funding to the governors of the states for special training needs. This discretionary program will serve as a useful means of providing JTPA funded State retraining programs to workers dislocated due to federal government actions such as contract cancellations and base closures.
*(Based on DBP estimates, the amount of funding allowed in the Secretary's discretionary fund may need to be increased by up to **$160 million** in order to handle the training needs of defense impacted workers in 1991.)*

6. United States Employment Service, DoL: The Department of Labor administers the United States Employment Service (USES) which provides placement-related services to job seekers and potential employers. USES services can provide defense impacted workers, especially those in the lower skill levels, with valuable contacts and information on employment opportunities within their region.

*(DBP estimates that the USES system may require an additional **$8 million** in funding in 1991 to assist defense impacted workers.)*

7. United States Unemployment Insurance (UI) System, DoL: The Federal government currently administers the nation's unemployment insurance system. The system is primarily funded by tax collections in the individual states which establish and control their own UI programs. The Federal government assumes fiscal responsibility for the nationwide administration of the program, and funds one-half of extended coverage benefits. In addition, the Federal government administers and provides extended UI related benefits such as Trade Readjustment Assistance (TRA) under the Trade Act of 1974.
*(Based on DBP estimates, a system of weekly allowances to displaced defense workers, such as TRAs, may require approximately **$60 million** in federal funding in 1991.)*

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[2] Based upon the three programs described, EDA may require funding of $31.5 **million** in 1991 to assist defense impacted communities. This figure is in addition to funding to be provided in order to support the traditional activities of EDA in 1991, assuming the programs are renewed.

**ADDITIONAL PROGRAMS**

**Community Planning and Economic Development Programs:**

8. EDA Technical Assistance Program, Dept. of Comm.: The EDA's Technical Assistance Program provides funds to help link the resources of universities to community economic adjustment, such as those in defense impacted areas (EDA University Centers Program).

9. EDA Long-term Economic Distress Program, Dept. of Comm.: This program awards grants to communities plagued with chronic economic problems. Defense impacted communities with long-term economic difficulties may find this program helpful in funding adjustment efforts.

10. Community Development Block Grant (CDBG) Program, Department of Housing and Urban Development: This program could serve as a useful mechanism for providing defense impacted communities with funding for large-scale housing and other economic development projects.

A) Entitlement Program: The CDBG Entitlement program could assist defense impacted urban communities meet their broader economic development objectives by providing urban areas with grants to acquire land, renovate housing, and provide public services.

B) Small Cities Program: The CDBG Small Cities program provides funding for projects similar to those in the Entitlement program, however, the funds are directed to smaller cities and counties. This program could allow smaller defense impacted communities to incorporate CDBG funding for housing and public works into their overall development plans.

C) State's Program: The CDBG States program could allow defense impacted states to develop and design their own programs for economic adjustment, incorporating CDBG funding for housing rehabilitation and public services. In this manner the states may provide CDBG coverage to rural defense impacted communities not covered under the entitlement or small cities programs.

11. Federal Airport Improvement Program, Federal Aviation Administration, Department of Transportation: This program provides grants for planning, construction, and rehabilitation at public-use airports. Such grants are useful in the modification and reuse of existing military airbases for civilian purposes.

12. Federal Surplus Real Property Disposal Program, Federal Surplus Personal Property Donation Program, Federal Surplus Personal Property Sales Program, General Services Administration: These programs are all means of transferring federal government property to state and local governments and the private sector, through its sale, exchange or donation. Communities facing defense facility closures or cut-backs may benefit from the facilitated transfer of such resources.

**Worker Retraining and Employment Programs:**

13. Apprenticeship Training Program, DoL: This program provides advisory services and counseling to assist industry in creating and improving in-house and apprenticeship programs. Defense firms may find this program useful in preparing workers for work on new commercial programs.

14. Trade Adjustment Assistance (TAA) Program, DoL: This program provides specialized services and direct payments to workers who are dislocated or underemployed due to imports. Displaced defense workers could benefit from this program, or one modeled on it, through expansion of its provisions to include defense-related dislocations (see section on Unemployment Insurance above).

15. Job Opportunities and Basic Skills (JOBS) Training Program, Health and Human Services: This program can benefit qualifying families of dislocated defense workers. It provides formula grants to needy families, allowing them to receive education, training and employment services.

**Private Sector and Technology Development Assistance:**

16. EDA Business Development Assistance Program, Dept. of Comm.: This program provides loan guarantees and grants to businesses that create or retain jobs, or expand or establish plants in the context of a community's adjustment effort (such funding is traditionally provided when no other sources are available).

17. Regional Centers for the Transfer of Manufacturing Technology Program, National Institute for Standards and Technology (NIST), Dept. of Comm.: This program assists businesses in adopting advanced manufacturing technologies through the assistance of regional technology centers. Such programs may ease the transition of defense firms to new commercial technologies and markets.

18. State Technology and Extension Program, NIST, Dept. of Comm.: This new program facilitates the transfer of technology to small businesses, such as smaller defense firms, thus assisting them in addressing productivity and quality concerns.

19. Advanced Technology Program, NIST, Dept. of Comm.: This program provides grants to firms wishing to form joint research and development ventures. Such assistance may help defense firms in exploring the dual-use capabilities of their products and in moving to new commercial markets.

20. Clearinghouse for State Technology Programs, NIST, Dept. of Comm: The Clearinghouse could benefit defense impacted firms and communities by serving as a repository for currently unavailable information on state economic development and technical assistance programs.

21. Industrial Development Grants (IDG), Department of Agriculture: IDG project grants can benefit smaller defense firms in rural communities by facilitating their transition to the civilian markets. This program can assist firms by providing funds for equipment, building renovation and expansion, and pollution control.

22. Small Business Loan Programs, Small Business Administration (SBA): The Small Business Administration provides several loan programs which may be useful to smaller defense firms.

A) Business Loans [7(a)(11)]: This program provides Direct Loans, advisory services and counseling to small businesses owned by low-income persons, or persons located in labor surplus areas. This program may provide gap-financing to smaller defense firms hoping to develop new commercial technologies or production methods.

B) Regular Business Loans [7(a)] and Business Loans for 8(a) Participants: These programs provide guaranteed loans (the programs for 8(a) participants also provides direct loans) to businesses owned by low-income persons or located in a labor surplus area. (These firms may be unable to receive financing in the private

credit marketplace, but demonstrate an ability to repay loans if granted.) These programs may provide needed gap-financing for firms hoping to develop new commercial products.

23. Small Business Development Assistance, SBA: This program may benefit small defense firms by providing them with advisory services and counseling, technical information, and training. This program may assist smaller defense firms in planning adjustment strategies and managing their transition to lower levels of defense spending.

24. Small Business Procurement Assistance, SBA: This program provides various services which may assist defense firms in gaining federal contracts and subcontracts. This program could ease the transition of smaller firms away from defense contracts.

25. Small Business Innovation Research Program (various agencies): This program provides small businesses with federal research and development grants, helping such firms maintain their technological base. This program may assist high technology and research related small businesses diversify away from dependence on defense business.

26. Small Business Investment Companies Program, SBA: The SBIC program can indirectly provide small defense firms with capital that could facilitate their transition to new technologies and markets. This program provides funds, through direct and guaranteed loans, to SBICs which make equity and venture capital investments in small firms.

27. Small Business Development Center Program, SBA: This program can facilitate the transition of smaller defense firms to commercial products and markets. The program could assist smaller defense firms, providing project grants, technical information, management counseling, training and technical assistance.

28. Certified Development Company Loan Program, SBA: This program provides long-term guaranteed loans that may help smaller defense firms make the transition to lower levels of defense spending by making it easier to acquire land, buildings, machinery and equipment, or to carry out construction and renovation.

29. State and Local Development Company Loan Program, SBA: This program provides guaranteed loans to state and local development companies, which in turn assist smaller business, such as small defense firms, in acquiring land, buildings, equipment and machinery, or to constructing and modernizing buildings.

30. Export-Import Bank Programs: The Export-Import Bank is prohibited from assisting in the export of military-related products. The Bank's loan programs might, however, assist small to medium-sized defense firms develop new commercial products and exports markets for those products. Programs which may be especially helpful to defense firms wishing to commercialize are: Working Capital Guarantee Program, Direct Loans, FCIA New-To-Export Insurance Policy, FCIA Multi-Buyer Insurance Policy, FCIA Medium-Term Single-Buyer Insurance Policy, FCIA Lease Insurance Policies.

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31. Independent Research and Development (IR&D) Program, DoD: This DoD program provides partial reimbursement of development costs to defense firms conducting research and development projects of use to DoD. If expanded, this program could assist defense firms not only in developing useful defense technologies, but also in developing dual-use technologies with commercial applications.

32. Technology Utilization Program, National Aeronautics and Space Administration (NASA): This program disseminates technical information regarding the possible dual-use and commercial applications of space technologies. This program could help to link defense firms to new commercializable products.

Dr. GANSLER. The one point I would like to make, Senator, is that what is missing in that list is there is no organization that is really trying to address the problem we are talking about here. And I think that is really important.

In other words, no one is really trying to come up with a long-term vision of where we want the defense industry to be in 5 years, and what steps should be taken in that direction toward, say, critical technologies or things of that sort.

Senator LEVIN. Providing us that list does not imply that you agree that enhancing these capabilities would do the job.

Dr. GANSLER. Yes.

Senator LEVIN. I would not want to suggest that.

Dr. Melman, do you very briefly want to answer this?

Dr. MELMAN. No present agency functions to induce alternative use preparation in the factories, bases and laboratories now serving the military enterprise.

Second, the present operations in place do not serve the function of doing advance planning. And advance planning is absolutely essential to avoid helter-skelter disorder and consider penalties on the people involved.

Third, the existing operations do not cope with the problem of occupational retraining, notably for managers and engineers, and some production workers in military work, to retrain them to be suited to civilian work.

Fourth, the present available mechanisms do not induce a process of capital budget planning by the States, by the cities, by the county governments, which is essential for establishing the dimensions of the market for new public works that would be very important for every firm that contemplates alternative use work for their facilities.

Finally, the present institutions do not address the problem of an ordered reversal of the arms race. And that is the reason why in my initial testimony I called attention to the importance of putting on the table now once again President Kennedy's plan first laid out in April 1962 for this purpose.

Senator LEVIN. Thank you, Doctor.

Senator BINGAMAN. Thank you very much.

I want to thank this panel. I think the testimony has been excellent, and the discussion has been very useful for the committee. We appreciate it very much.

At this point let me call the second panel forward. Mr. Stanley Pace from General Dynamics Corporation; Mr. William Haggett from Bath Iron Works; and Mr. Howard Samuel, the AFL-CIO Industrial Union Department. I do appreciate your being here, and we appreciate your patience in waiting for the first panel to complete its work.

Mr. Pace, why don't you start and give us any thoughts you have. Again, I would urge that each of you try to summarize your point of view in 8 or 10 minutes, and then that will leave a little time for us to ask some questions. We will be glad to include your prepared remarks in full in the record.

## STATEMENT OF STANLEY C. PACE, CHAIRMAN, CHIEF EXECUTIVE OFFICER, GENERAL DYNAMICS CORPORATION

Mr. PACE. Thank you very much, Mr. Chairman, Senator Riegle, Senator Levin. I appreciate the opportunity to be with you today and express my thoughts. I apologize for my voice. I have a little laryngitis, and I hope with the benefit of this water, I will be able to get through my remarks. I have submitted a statement for the record, and I will try to summarize it here very briefly.

I do think that we in the defense industry are very pleased with the situation that is occurring, and the reduced threat from the Soviet Union has many benefits for the U.S. economy. And although it has an adverse effect on our companies and our employment, we welcome the reduced tensions.

I would like to mention very briefly that in my view the change has come about because of two things principally: one, the fundamental failure of communism versus the free market type of economy; it has just put a strain on the Soviet Union from an economic standpoint so that they can no longer continue the arms race, and therefore they must pay attention to their basic economy.

The second thing is the continuing pressure that the United States as a benign giant in the defense arena has continued for decades with the support of the Congress and the American public in preparing and maintaining a strong defense force without aggression, which meant of course that the Soviets were not able to counter that in any way over the period of time. And I think these two things together bring about the change that we all welcome so much.

During the past many years the defense structure, from a strategic standpoint, has been that we would counter the numerical superiority of the Soviets with the technical superiority of our weapons. This clearly has been the proper strategy. It has been very effective.

Two recent examples of that: one is the air war over Bekka Valley between Israel and Syria, which very clearly demonstrated the technical superiority of our aircraft and associated equipment, where the score was 86-zip and the technical superiority was demonstrated.

More recently the Stinger in Afghanistan with its technical superiority was very influential, in my view, in being one of the elements that convinced the Russians to move out of Afghanistan in the way that they have done.

Looking at the present position of the percentage of the GNP that the defense budget now takes, I think, we need to put that in perspective. If you go back to the latter part of World War II, the defense spending reached a peak of 39 percent of the gross national product.

And then of course it has cycled down and then back up. But each time the peak of the rise has been reduced. In the Korean war it was 14 percent, in the Vietnam war it was 10 percent and under the recent Reagan build-up it reached 6.5 percent of GNP. At the present time it is approximately 5.5 percent.

It is anticipated and forecast by some that that 5.5 percent that we have presently could diminish to less than the low point previ-

ously of the mid-1970s of 4.8 percent. Exactly where that will be, we really do not know.

With regard to the interest that this committee has with the reduction in this defense effort, we need to keep in perspective what I have just said, but also need to recognize that the speed with which the change is made will have a significant effect one way or another as to how well the economy and the personnel and the companies can accommodate to that change and absorb it with a reasonable amount of pain, rather than excessive pain.

We do know that in the future the Soviet Union, despite the changes that have been made, will continue to maintain a basic threat, primarily, if you will, significantly from a strategic standpoint but from other standpoints as well. So the situation today calls for a rational and thoughtful analysis of our defense position both from a military and industrial capability.

In my view, I want to stress that for our Nation's security it is necessary that we maintain at least three equally important elements—or you might say insurance policies. One insurance policy would be a force structure that is properly sized, manned and trained. The second one would be equipment for that force structure that is superior in combat effectiveness to that of any other nation in the world.

In other words, the combat effectiveness of the current equipment must be superior to that of any nation in the world. It is that key factor amongst others that has been so supportive of our defense for the past 45 years.

And third, a technical industrial base is needed that will provide a continual basis of research, development, production and fielding of those types of weapons systems that are deemed to be vital—and this I emphasize—deemed to be vital for our present defense needs and our future needs.

What I propose now is, in essence, a technical and industrial concept, not a policy, not a plan, but a technical industrial concept. It would allow the reduction and consolidation of our industry, but not below a level required to maintain a technical and industrial base adequate for both current and future defense needs.

So, therefore, it is vital that we understand not only what our current needs are, but what our future needs will be. And that requires more research, more analysis as many have already said.

Under such a concept we would first identify those types of weapons systems which are considered vital to our present and future defense posture and make sure that at least one, preferably two, but at least one manufacturer would exist which would be performing the research and development and engineering for an evolutionary improvement of that weapons system so that it could periodically upgrade on block changes the equipment that is in the field and as necessary come up with a completely new design from a clean sheet of paper.

And, last, we want to field that equipment not only for the purpose of maintaining that technical superiority of equipment with our reduced force structure, but also so that we could get the feedback from the sailors and the soldiers and the airmen as to what was wrong with that equipment and how it might be improved.

That in its simplest form is the concept that I propose. It requires that we do analysis of our true needs, and it requires that we do a certain amount of selection as the work goes down.

We were pleasantly surprised by the speed and scope of the changes in Eastern Europe. We could be just as unpleasantly surprised by future development anywhere in the world. We must, therefore, be prepared for these unknown threats. That it is going to take analysis of a nature that we have not done in the past and which we must now do.

So far I have addressed what I consider to be the most important element of the study that you are making. Now, I would like to address more specifically the issue of the conversion of our defense manufacturing plants to commercial manufacturing plants, which is one of the concerns that you have for this hearing.

Based upon my personal experience in government, in commercial manufacturing and in defense manufacturing, I would like to list a few facts, premises or opinions—call them what you will.

First, the culture of doing business in a defense plant is significantly different from the culture of doing business in a commercial plant. The difference is not because one group of individuals is more or less efficient than the other. The differences are there, as have been explained by the prior panel, because these two different activities, commercial and defense, are responding to different customers and different market requirements as specified by those customers, and different stimuli.

For a couple of examples, in the defense equipment there is an absolute necessity for superior combat effectiveness. A less costly, less effective system will provide you with defeat rather than victory.

The defense industry is burdened by audits, cost certification, design reviews, oversight, annual buys, annual budgets, annual appropriations by Congress, congressional hearings as well as the added implicit responsibility that the defense industry has that is present because we are spending taxpayers' money.

All these things are fundamental to the cultural difference. The defense industry is significantly different, not by preference but because of the things that are different and applied to us by our customers.

You can debate whether or not those are necessary—and the preceding panel suggested that they were not—but that is an opinion that can always be argued. But the fact that they are different is the only point that I am making.

Second example. A defense industry plant has a very difficult time because of this difference in doing commercial work mixed with defense work. History is replete with these examples, some of which were mentioned, and I could mention others, but I will not take the time to do that.

Third, defense engineers, managers and all employees can individually successfully transfer from one culture to another, the defense culture to the commercial culture and vice versa, but it takes time and the individual has to leave, depart from his historical culture and move as an individual to that new culture. And if he does that, he can be absorbed and he can learn because the new culture is there and will train him.

Conversely, if you try to bring a commercial product into the defense manufacturing culture, there is no one there to tell him the do's and the don'ts of the commercial world and, therefore, the lack of training, the inability to train is great.

Fourth, in my view there are not at the moment any great commercial unmet market needs out there. To the extent that such market needs exist, they are being chased very effectively by those commercial companies which are highly experienced in those markets.

So when we say that we are going to bring into a defense plant commercial products to create employment for our defense employees, we are implying that we are going to bring some business, be it automobiles or machine tools or electronic equipment now being made by some other company in some other plant with other employees and put it into the defense plant. This simply transfers jobs from one plant to another. It does not create jobs.

Therefore, based upon these reasons I conclude that the best concept for conversion is to take the defense industry down slowly along the technical and industrial base concept that I have described and as the individuals are laid off, assist them in transferring individually into the commercial, cultural world or into government or into academia. I believe very strongly that money spent on trying to convert a tank plant or a missile plant or a submarine plant to commercial products will be wasted.

Thank you very much for your attention.

[The prepared statement of Mr. Pace follows:]

STATEMENT BY

STANLEY C. PACE

CHAIRMAN AND CHIEF EXECUTIVE OFFICER

GENERAL DYNAMICS CORPORATION

Mr. Chairman and members of the Committee, I welcome this opportunity to share with you my views on how our nation's defense industry can adjust to a rapidly changing worldwide political environment while continuing to provide the types and quantities of equipment needed by the military services to protect our national security.

It is safe to say that America's defense industry stands on the threshold of major change. For the first time since the late 1940s, we are engaged in a fundamental review of the posture of U.S. forces around the world and of the roles and missions assigned to our military services. This reassessment, the result of unanticipated and sweeping changes in Europe's political landscape, has sparked calls for substantial reductions of our forces and their equipment. Such reductions will reshape America's defense industry. What is more important, the industry's essential function, transforming its research and development into production systems vital to national security needs, will depend on the prudence and wisdom in deciding the allocations of our military and industrial resources.

The success of our defense posture over the past 45 years was based on a similar decision made soon after the conclusion of World War II. Our leaders determined then that the United States could best deter Soviet aggression and expansion by countering their numerical military superiority by our own technological superiority. This strategy has worked. The performance of U.S.-made fighter aircraft in the Bekka Valley in 1982 was one demonstration. More recently, the success of the Stinger in Afghanistan was another. We must think very carefully before either abandoning or altering what has worked so well for us. As Winston Churchill reminded us: "If we open a quarrel between the past and the present, we shall find that we have lost the future."

At stake in the future is not only the defense of U.S. territory. Equally or more important is the preservation of our way of life, the principles of individual liberty and human dignity. Without national security, pursuit of these freedoms and principles is impossible. Self-defense remains a sacred right and a moral duty of free nations. Our world remains a volatile place, even with the diminution of the Soviet threat. The division between tyranny and liberty still exists in our world, and as long as tyranny is armed, liberty must have the weapons for its defense.

In the past four decades, we established levels of defense spending deemed sufficient to avert Soviet aggression. Even with the cyclical nature of public and Congressional backing for military expenditures, these levels have been high enough to support an industrial base ready to supply a wide variety of sophisticated technologies, products and services for a broad range of military requirements.

We have been able to accomplish this despite the declining percentage of defense work to the total economy since the end of World War II, when defense spending reached a peak of 39 percent of GNP. Since then, each peak for military actions was progressively lower: 14 percent during the Korean War, 10 percent for Vietnam and 6 1/2 percent during the Reagan buildup in the early 1980s. Similarly, the valley following each spending buildup was lower than the previous one. Today the ratio is about 5 1/2 percent. Some predict that within the next several years defense spending will be reduced to less than the low of 4.8 percent it reached in the 1970s.

If defense budgets are now to be reduced significantly over a short period of time, the ability of our industry to continue providing products and services when called upon to do so will be severely curtailed or eliminated. Such consequences would be very damaging both for industry and for national security.

This is so because we do not yet fully understand what threats to our national security we shall face during the immediate future, and consequently, what kinds of missions our military forces will be asked to carry out against such threats. Similarly, it is difficult to predict what kinds of weapons will be required. It would, therefore, be rash to begin significantly dismantling the defense industrial structure before we can ascertain just what we shall be asking of it in the years ahead.

We do know that the United States and the Soviet Union will remain the world's two military superpowers in the foreseeable future. We also know that the political, social and religious instability in many areas of the world contains the seed for regional conflicts and, potentially, for worldwide conflicts. Our strategy for dealing with these two threats in the past was clear enough. We maintained a nuclear deterrent and established a conventional force designed to fight different kinds of wars in different places. Today, the situation has become more complex. It calls for a rational and thoughtful analysis of our defense position and of the military and industrial capabilities needed to support it.

I want to stress that for our nation's security it is necessary to acquire three equally important insurance policies:

- First, a force structure that is properly sized, manned and trained;
- second, equipment for that force structure that is superior in combat effectiveness to that of any nation in the world;

- third, a technical and industrial base that provides on a continuous basis Research, Development, Design, Production and Fielding of those types of weapon systems that are deemed vital to our future defense needs.

What I propose may be called a technical and industrial concept. It would allow the reduction and consolidation of our industry but not below a level required to maintain a technical and industrial base adequate for current and future defense needs. Under such a concept we would first identify those weapon systems which are vital to our present and future defense posture and make sure that at least one, but preferably two, manufacturers exist which (1) are performing the research, development and engineering for the evolutionary improvement of each vital weapon system type; (2) are producing at a rate sufficient to periodically upgrade and replace our equipment in the field by introduction of either block changes or completely new designs; and (3) are receiving the comments from our soldiers, sailors and airmen about the equipment and are responding to them through additional research and development for adjustments and corrections.

This concept requires the complete cycle, from R&D to design to manufacturing and to fielding the equipment. The variable in the concept is the rate of production. Our industry will have to become much more cost-effective at low production rates. I believe that this can be done and that unit cost can be brought down from historical norms. It will be far more efficient in dollars and time to do this than to start and stop a production line or to put a designed weapon system on the shelf, with the plan for it to be produced when needed in the future. Such a design will rot on the shelf. Technology cannot be warehoused. It is live and changes continuously. It is not static! It is fragile. Design and technology is in the minds of the technical people, far more than it is in the drawings.

We are all aware that the defense industry build-down will be challenging and often painful. But we must be careful that we do not reshape our defense capabilities, both technologically and industrially, just for budgetary or political reasons. We will not be able to resurrect these capabilities, should we lose them, without enormous expense and a great loss of time, both of which could cause grave damage to our nation's security. We were pleasantly surprised by the speed and the scope of the changes in Eastern Europe. We could be just as unpleasantly surprised by future developments anywhere in the world. We must, therefore, continue to be prepared for unknown threats of various types and levels of intensity. It is absolutely essential to develop and field the advanced technologies necessary to counter any and all future threats.

The time is now for all three concerned parties, the Congress, the Department of Defense and industry, to seek a plan or concept for sustaining an adequate technical and industrial base. We should not proceed with a defense build-down along a haphazard or arbitrary path.

The stakes are too high. In the commercial marketplace, failure can be costly. In defense, it can be fatal. We cannot afford to take that risk.

So far, I have addressed what I considered to be the most important industry issue caused by the planned reduction in our defense forces and I have suggested a concept for handling it.

Now, I would like to address the issue of conversion of our defense manufacturing plants to commercial manufacturing plants, which is one of the concerns of this hearing.

Based upon my experience in government, in commercial manufacturing and in defense manufacturing, I want to list certain facts, premises, or opinions:

(1) The culture of doing business in a defense plant is significantly different from the culture of doing business in a commercial plant. The difference is not because one group of individuals is less efficient than the other. They are different because they are responding to different requirements and stimuli. For a couple of examples: (a) In defense equipment there is an absolute necessity for superior combat effectiveness. A less costly and less effective weapon system will provide defeat. (b) The defense industry is burdened by audits, cost certifications, design reviews, oversight, annual buys, annual budgets and annual appropriations by Congress, Congressional hearings, as well as the added responsibility of the spending of taxpayers' money.

(2) A defense industry plant has a very difficult time doing commercial work mixed with defense work. History is replete with examples of problems and failures.

(3) Defense engineers and managers can successfully transfer from one culture to another, but it takes time and the individual has to leave his historic culture and move as an individual to the new culture.

(4) There are no great commercial unmet market needs out there. To the extent they exist and are growing, they are being chased very effectively by those commercial companies which are highly experienced in those markets.

Therefore, I conclude that the best concept for conversion is to take the defense industry down slowly along the concept described earlier. As individuals are laid off, assist them in transferring individually into the commercial culture world, or into government, or into academia. I believe money spent on trying to convert a tank plant, or a missile plant, or a submarine plant to commercial products will be wasted.

Thank you.

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Senator BINGAMAN. Thank you very much for that statement.

Before we go to questions, let me call on the other two panel members to summarize their statements. First, Mr. Howard Samuel, President of the Industrial Union Department, AFL–CIO. Thank you very much for being here.

## STATEMENT OF HOWARD D. SAMUEL, PRESIDENT, INDUSTRIAL UNION DEPARTMENT, AFL–CIO

Mr. SAMUEL. Mr. Chairman, in view of the lateness of the hour let me summarize in 3 or 4 minutes my testimony which is before you. I am speaking on behalf of the Industrial Union Department of the AFL–CIO.

I can say in summary that we regard the process of reform and greater freedom in Eastern Europe as both an opportunity and a challenge. It is an opportunity to redirect our resources in areas which have been sadly neglected in the last many years, such areas as infrastructure, education, training, advanced technology, and job creation.

It is also a time of challenge because it is not an easy matter to undertake the transfer of such tremendous sums from one sector to another. It means a transfer of labor, a transfer of capital, machinery and other economic resources.

We believe it will take careful planning to assure that it does lead to progress and prosperity for all sectors of our society and all regions of our Nation and not to dislocation for hundreds of thousands of workers, their families and the communities in which they live.

We point out in the statement that some of the responsibility lies directly with the Department of Defense. One of those areas is the fact that the Department of Defense we believe now has much too great a dependency on foreign sources for its products. No one knows exactly how much, but it obviously adds up to billions of dollars and hundreds of products.

It is not a very good idea for a number of strategic and national security reasons. It is particularly not justified today at a time when we have resources available in our own country to provide some of these products.

The second point is in regard to the Department of Defense responsibility and was made very well by the earlier panel; that is, its responsibility to move into the dual use technology area and to the extent possible, which is much greater than it is now, purchase things which can be used both for civilian as well as military purposes.

However, we do not believe that the Department of Defense can have the primary responsibility for overseeing and supplying the needs for a conversion effort. First of all, we suggest very strongly that the effort should start with a plan, a plan possibly designed by a commission representing government, government at all levels by the way, as well as business and labor and the community. The one thing we fear is that this whole process will be left simply to a bunch of uncoordinated Federal departments or even to local areas without any particular direction, without any particular guidelines. The result, I think, could be disastrous.

Second, I think we must be aware of the fact that the conversion process cannot be undertaken without substantial cost. It is going to cost money to make sure that perhaps several hundred thousand workers are redirected, are retrained, are sustained during the conversion process. We do not believe that any of the present institutions that we have in the Government are really equipped to do it either in terms of their purpose and direction or certainly not in terms of their resources. I am thinking of the Trade Adjustment Assistance Program, of the Job Partnership Training Act (JPTA), and of the Economic Dislocated Workers Assistance Act (EDWAA). None of those programs really were designed for this purpose. They are not equipped to handle it, and they certainly do not have the funding.

So our feeling is that there probably should be the establishment of a special trust fund designed for this particular purpose, the large numbers of people in a rather short period of time who are going to have to have support, both income support, health benefit support, and make it possible for them to get the retraining that is necessary and move back into the economy as quickly as possible.

I think in all of these adjustment efforts the key thing that should guide us is that the overwhelming number of workers who will be dislocated will be potentially valuable members of the work force. All of them have developed skills and work habits which have proved useful for this industry, and they represent an important asset in a labor force which at the present time is widely known to be undersupplied with experienced and reliable workers.

So providing these workers with adequate income support, including health benefits, during the adjustment process will yield an immediate payoff to the economy as a whole. It will be to everyone's benefit to get them back into the labor force as quickly as possible.

Let me add as a footnote to this that one of the ways we can get them back into the work force quickly is to increase the advance notice provisions in connection with conversion to provide at least a 1-year advance notice. Every study of the adjustment process has demonstrated that the longer the advance notice, the more effective will be the adjustment programs and the shorter the time required for the process to be completed.

I think this summarizes my statement, Mr. Chairman, if I may include the full statement in the hearing record, and I will be glad to answer your questions.

[The prepared statement of Mr. Samuel follows:]

Testimony of Howard D. Samuel
President, Industrial Union Department (AFL–CIO)

Mr. Chairman and members of the subcommittee, my name is Howard D. Samuel, and I am president of the Industrial Union Department, a semi–autonomous division of the AFL–CIO. We have 53 international unions affiliated with us, with a membership of 4 1/2 million workers. I appreciate this opportunity to present the views of the Industrial Union Department to you.

We view the process of reform and greater freedom in Eastern Europe, leading to a decline in Cold War tensions, as a major opportunity for the United States. It is an opportunity to turn our attention to a number of areas which have been sadly neglected during the years of the Cold War, when soaring defense expenditures may have strengthened our military posture but left the foundation of our economic and industrial strength dangerously eroded. It is an opportunity to redirect our resources to our nation's unmet needs, such as education and training, public investment in bridges, roads, airports, waterways and other elements of our infrastructure, to job creation and an advanced technology agenda—the needs we must meet if we are to compete in the global economic arena.

But it is also a time of great challenge. It is no easy matter to undertake the orderly transfer of labor, machinery and other economic resources from military to civilian purposes. It will require careful planning, based on an agreed set of goals and a realistic inventory of such resources as workers and their skills, plant capacities and management capability. The process of redirecting our resources can lead to progress and prosperity for all sectors of our society and all regions of our nation—or it can lead to dislocation for hundreds of thousands of workers and their families and communities in which they work and live.

So we have a dual responsibility. We must assure that the conversion process enriches the nation as a whole, and we must be responsive to the special needs of the workers and communities which will be most directly affected.

The victory of freedom and democracy in Eastern Europe is a victory for all of us. But we must make sure that it does not turn out to be a hollow victory for those who have worked in the factories or on military bases essential to the preparedness effort during the long years of the Cold War.

A major share of the responsibility lies with the Department of Defense. As the defense budget winds down, one of its first steps should be to reduce its dependency on foreign sources. I do not believe that anyone in the Defense Department—or anywhere else, for that matter—has precise knowledge as to the extent we purchase military supplies from foreign sources, but no one has any doubt that the amount adds up to billions of dollars and thousands of items. Some of these items must be purchased from abroad because there are no domestic U.S. manufacturers. Other items are purchased from foreign suppliers as a result of memoranda of understanding based on a desire to involve our allies in weapons production. In either case, excessive foreign dependency has a lot wrong with it for a number of reasons. We lose the edge in research and development when it is done overseas, and thus we are likely to end up behind the curve of technological progress. As we come to depend on foreign sources, we are likely to pay more, and get less, since we have no control over business practices in other countries. In times of conflict, furthermore, our supply lines could be interrupted, or foreign countries may decide that our interests do not coincide and could hold up deliveries of key components.

Finally, at a time of declining defense expenditures, we owe it to our workers and our communities to move as much as possible of our production into domestic factories.

It is also important that the Defense Department follow the advice of a number of its advisors to make greater use of dual use technologies—of products, in effect, which can serve both the civilian and military markets. By setting unnecessary standards for hundreds of products which could be bought off the shelf, the military has slowed the development of many of the technologies it depends on—and as a result, ends up getting an inferior product at higher costs. The example of the $900 toilet seat, which so excited Congress a few years ago, is a product of this procurement practice.

Today, as the procurement budget winds down, it becomes more important than ever that unnecessary military specifications be eliminated and the Defense Department look more to the civilian economy to supply all but those needs which cannot be duplicated. The extra benefit today would be the strengthening of our industrial base, of our ability to meet the needs of both the civilian economy and the defense establishment.

But the Defense Department cannot, and should not, be given the sole, or even the principal responsibility for assuring that the conversion process is productive and fair. That is a job for government, not just the federal government, but state and local governments as well. And the process should involve not only government but representatives of labor, business and the community as well.

We should start with a plan, and a commission representing government, labor, business and the community to develop a plan. Too much of our resources are involved, too many people and communities are affected, to leave the conversion process to chance, or to spread the responsibility around a dozen uncoordinated agencies.

The planning process should take place not only here in Washington but also at the local level, where the major impacts will be felt. For this purpose, one of our first steps should be to direct government support to establish broadly representative planning agencies at the state and local level, which although operating within clear guidelines, nevertheless should be encouraged to use their own determination and creativity to devise their own initiatives.

The conversion process will not be without cost. We cannot depend on existing programs, or existing levels of support, to meet the vastly increased needs of a major economic conversion. There are more than three million workers employed in defense related jobs in private industry, and another 1.1 million civilian employees of the Defense Department. Approximately a half million workers are directly employed in the production of guns, ships and planes and other weaponry. The process of dislocation has already begun. In the past ten days, three major companies announced layoffs that will eliminate 10,000 jobs in the defense and aerospace industry.

What should be our response? Unemployment compensation is clearly not an adequate answer; even now it covers less than one third of the unemployed, and the levels of assistance are far too low to meet the needs of a large number of workers who will require income support during a period of dislocation. In addition, dislocated workers will in most cases lose their health insurance and other forms of family support.

Nor can we depend on other government adjustment assistance programs. The Trade Adjustment Assistance program is limited, as it should be, to dislocation caused by trade policy, It is underfunded and inadequate and was never designed to meet the potentially massive dislocation we will face in large–scale conversion. A more likely source of support would be a substantially expanded Economic Dislocated Workers

Adjustment Assistance program, which was expressly designed to meet the needs of the dislocated, regardless of the cause. EDWAA is also underfunded; it can presently meet the needs of approximately 100,000 workers, and as the conversion process develops, we will need to provide adjustment assistance for several hundred thousand workers. In addition, EDWAA must meet the needs of workers who lose their jobs for reasons unrelated to military conversion—a goal which is already proving difficult to meet.

There is considerable support within the labor community for the establishment of a trust fund specifically designed to meet the needs of laid–off defense workers—in terms of both income assistance and benefits—to carry them through the conversion process or through job search and training if no alternative use is found for their facility. There is no precedent for the conversion process, either in numbers or scope, and the wisest course would be to create a specially designed program to meet the needs of those dislocated defense workers.

In all of these adjustment efforts, we should be guided by the knowledge that the overwhelming number of workers who will be dislocated by the conversion process will be potentially valuable members of our labor force. All of them have developed skills and work habits which proved useful for an important industry, and they represent an important asset in a labor force which is undersupplied with experienced and reliable workers. Providing these workers with adequate income support, including health benefits, during the adjustment process will yield an immediate payoff for the economy as whole; it will be to everyone's benefit to get them back into the labor force as quickly as possible in jobs which take full advantage of their hard–won experience.

As an important footnote to the adjustment need, it is also vital that in a new program we include a one–year advance notice provisions. Every study of the adjustment process has demonstrated that the longer the advance notice, the more effective will be the adjustment programs, and the shorter the time required for the process to be completed. In the defense establishment there is a rationale for more than six months notice.

Ignoring the needs of dislocated defense workers and their communities will end up costing us much more than providing assistance to meet their needs. And the costs will represent the ultimate waste of valuable resources. The conversion process must be recognized for what it is, an opportunity to strengthen our industrial base and our democracy's ability to meet the challenges of a new era. It is a challenge that involves all of us, and all of us have a responsibility to be involved. We in the labor movement, who represent a large percentage of the workers who will be the most directly impacted, will look to the Congress to set realistic policies and goals for the conversion process, create the mechanisms to bring them about, provide the resources which will be needed and the leadership that the opportunity requires.

Mr. Chairman, we are grateful for the opportunity to have testified during this hearing and to share with you the views of the Industrial Union Department of the AFL–CIO. I will be pleased to attempt to answer any questions you may have.

Senator BINGAMAN. Thank you very much. We will have some questions for you.

Now let me call on William Haggett, who is the Chairman and Chief Executive Officer for Bath Iron Works Corporation. Thank you very much for being here.

**STATEMENT OF WILLIAM E. HAGGETT, CHAIRMAN AND CHIEF EXECUTIVE OFFICER, BATH IRON WORKS CORPORATION**

Mr. HAGGETT. Thank you very much, Mr. Chairman and Senators. It is a pleasure to be here. As a matter of fact, I flew out of Maine this morning in pea soup fog at about 5:30 and landed in Philadelphia in pea soup fog and rain, and I asked myself all the way down why I was doing this, and I think I got the answer when I heard the previous panel, and I really am delighted to be here and to have an opportunity to react.

I have a statement that I would like to submit for the record and I would like to give you my observations on some of what has been said this morning, and some of what is in my statement.

First, perhaps my background is considerably more narrow than those of some who have spoken earlier today, so let me just describe that to you. I am the Chairman of Bath Iron Works. We are a shipbuilding company in Maine. We employ 11,600 people. We are Maine's largest employer. We are the third largest shipbuilder in the United States, and my background is 27 years in the business. I have headed our company for a number of years. I have also been Chairman of the Shipbuilders' Council of America.

Bath Iron Works has been a far more diversified shipbuilding firm than General Dynamics Electric Boat Division, for example. Today we are building destroyers, we are building cruisers, we are in the overhaul and conversion of Coast Guard cutters, we are into technology transfer programs in Canada, Australia and Taiwan, we are working with the U.S. Navy on software-related programs.

Bath Iron Works in about 100 years has built 400 ships. When the current ships are delivered, exactly 200 of the ships will have been built for the U.S. Navy. The balance will have been built for private customers.

Since 1968, Bath Iron Works has built 20 merchant ships, as long as there was a merchant shipbuilding market we stayed in that business. We delivered our last ship in the early 1980s. The type of commercial ships that we have constructed include tankers, container ships, cargo ships and unique ships like power-generating barges, ocean dredges, and a variety of merchant ships.

Unlike Mr. Pace's comments, I think that at least for Bath Iron Works, we can and have demonstrated that it is possible to remain viable in both the commercial and military market. We have been a high-quality producer in both markets, and were very competitive in the merchant shipbuilding market until that market disappeared in the United States some time ago.

I almost had blood dripping from my lip this morning listening to your earlier panel. I find it very troublesome when people out of the academic community come to the Congress of the United States and make statements to you that in my view are very uninformed. It is troublesome to me that Bath Iron Works at least is referred to

as a company that is motivated to drive costs up. That is a ridiculous statement. I find it offensive when we are called an industry that does not emphasize high quality. The implication is that we are a low technology industry, or that our technology, quality. and costs are not comparable or competitive in the world market.

The fact of the matter is, Bath Iron Works is highly motivated to lower cost. We produce superb quality. The technology that we produce in terms of our overall ships including the radars and sonars that go into those ships, makes building a trolley-car look like child's play. We invest considerable amount of capital, Senator—$85 million in the last 5 years to improve facilities and to train people, and we have invested tens of millions of dollars to lease assets to keep us on the high tech side of our business.

Therefore, we have been diversified. We are not frightened by the thought of conversion, as long as conversion is possible. I totally agree with Mr. Pace that a phase-down in defense spending must come at a prudent, measured rate to avoid creating catastrophic problems for defense contractors. A significant, rapid reduction in defense spending would probably destroy our company. General Dynamics may have components that can survive because of the diversity of that organization, but we do not.

The key to success for our company, and I think virtually every shipbuilder, with a couple of exceptions, is that new market opportunities must be created in order to provide us with the opportunity to diversify to a greater degree and to move into—in our case, back into the merchant shipbuilding market. Only one merchant ship has been built in the United States—been contracted for in the United States since 1984. That has happened despite the fact that the world market for merchant ships has been stimulated and is now growing. One ship is being built here, 400 ships are being built in Japan.

American shipyards over that period of time, with respect to labor rates and other factors, have become increasingly competitive, although not yet fully competitive. The reason American shipyards stopped building merchant ships was that shipbuilding subsidies were eliminated here in the early 1980s, and yet subsidies continue in other world markets. Japanese, Norwegian, Northern European, Korean shipyards, which are all busy, are heavily subsidized, and we are trying to survive on that unbalanced playing field.

I will wrap my comments up briefly. The types of steps that should be taken to reduce defense spending and create an environment leading to conversion at least with respect to shipyards are these. I agree with the statement that was made that government requirements imposed on defense contractors are excessive. Many of them, including bureaucratic requirements, could be eliminated without affecting the quality of the end product or degrading the importance of the equipment which Mr. Pace so appropriately emphasized. So I would first try to squeeze costs down.

I would then gradually phase down the requirement for new weapon systems as strategy dictates and as your budget pressures demand. I would at the same time stimulate new alternative markets for shipbuilders. That means working with one of several al-

ternatives that could be implemented to create a merchant shipbuilding market in this country.

As a last resort I would begin to think about the kind of programs that our previous speaker mentioned to take care of those people who simply cannot make the transition from one job in our industry—from a job in our industry building one type of product—to another. For those it is going to be necessary to go through retraining. And, perhaps our Government has an obligation to provide continuing subsidies for those people who cannot be reemployed.

But I would give a very high priority to the creation of markets that will keep people employed as opposed to finding ways to pay subsidies. And if one of the earlier speakers' comments that managers should either be retired or retrained really applies to me, I am willing to go through the retraining myself. Thank you very much.

[The prepared statement of Mr. Haggett follows:]

STATEMENT OF
WILLIAM E. HAGGETT
CHAIRMAN AND CEO
BATH IRON WORKS CORPORATION

SENATOR BINGAMAN AND SENATOR WALLOP, THANK YOU FOR THE OPPORTUNITY TO APPEAR BEFORE THE SUBCOMMITTEE TO DISCUSS DEFENSE INDUSTRY ADJUSTMENT. YOUR SUBCOMMITTEE HAS ALREADY DEVOTED SUBSTANTIAL ATTENTION TO THE HEALTH OF OUR NATION'S DEFENSE INDUSTRIAL BASE.

MY COMMENTS WILL ADDRESS RAMIFICATIONS OF THIS YEAR'S DEFENSE BUDGET DEBATE, COMMERCIAL PROSPECTS FOR US SHIPBUILDERS, POLICY OPTIONS TO EXPAND NON-DEFENSE OPPORTUNITIES FOR THAT SECTOR, AND SEVERAL ADJUSTMENT AND CONVERSION INITIATIVES BEFORE THE CONGRESS.

DRAMATIC CHANGES ABROAD SET THE STAGE FOR FUNDAMENTAL RETHINKING OF US DEFENSE REQUIREMENTS AND STRATEGY. ALL AMERICANS HAVE A STAKE IN THIS DEBATE. TODAY'S HEARING IS AN ATTEMPT TO DEFINE THE IMPACT THESE PROFOUND CHANGES WILL HAVE ON THE ECONOMY AND ON THE LIVES OF WORKING AMERICANS ENGAGED IN DEFENSE PRODUCTION.

A GRADUAL PHASE-DOWN OF DEFENSE EXPENDITURE OVER A PERIOD OF YEARS REPRESENTS THE ONLY RATIONAL ECONOMIC AND NATIONAL DEFENSE COURSE AS WORLD EVENTS UNFOLD AND REQUIREMENTS CHANGE IN RESPONSE. CONGRESS AND THE ADMINISTRATION MUST EVENTUALLY DECIDE ON THE LEVEL OF DEFENSE SPENDING FOR FY'91 AND BEYOND AND I AM CERTAIN YOU KNOW THAT DECISION WILL AFFECT THE EMPLOYMENT PICTURE FOR MILLIONS OF OUR CITIZENS.

RECKLESS CUTBACKS IN DEFENSE THIS YEAR COULD JEOPARDIZE LONGTERM SECURITY, CAUSE SIGNIFICANT DISLOCATION, AND RISK THE IRREVERSIBLE LOSS OF VITAL INDUSTRIAL CAPACITY AND WORKER SKILLS. BUSINESSES, STATES, AND LOCAL COMMUNITIES HAVE A MUCH BETTER CHANCE OF SUCCESSFULLY MANAGING ECONOMIC ADJUSTMENTS RESULTING FROM A DEFENSE DOWNTURN IF THE PROCESS AT YOUR FEDERAL LEVEL IS MANAGED IN AN ORDERLY AND CONSCIENTIOUS WAY. A REASONABLE PERIOD FOR TRANSITION IS ESSENTIAL.

THE DOMESTIC SHIPBUILDING INDUSTRY AND ITS WORKFORCE PROVIDE A GOOD CASE STUDY.

THE MEN AND WOMEN OF BATH IRON WORKS SHARE THE POSITIVE REACTION OF ALL AMERICANS TO DRAMATIC CHANGES SWEEPING THE WORLD. IT WAS A SOURCE OF TREMENDOUS PRIDE FOR US WHEN PRESIDENT BUSH MET WITH SECRETARY GORBACHEV IN THE SUMMIT-AT-SEA ABOARD USS BELKNAP, A BATH-BUILT NAVY CRUISER WHICH SERVED AS A PLATFORM FOR PEACE.

AT THE SAME TIME, THEY AND OTHER DEFENSE WORKERS SHOULD NOT FEAR ABANDONMENT OF NATIONAL DEFENSE AS A HIGH PRIORITY NOW THAT THE FREEDOM WE ENJOY--GAINED IN LARGE PART THROUGH THEIR DAILY LABOR--HAS HELPED STIMULATE A PERIOD OF HISTORIC DEMOCRATIC EXPANSION ACROSS THE GLOBE. CERTAIN FACTS HAVE NOT CHANGED: THE UNITED STATES REMAINS AN ISLAND NATION. FORWARD BASING OF US MILITARY FORCES IS INCREASINGLY UNCERTAIN. ECONOMIC AND POLITICAL SURVIVAL REMAIN TIED TO FREEDOM OF THE SEAS AND ACCESS TO DISTANT MARKETS. DESPITE REDUCED PROSPECTS FOR CONFLICT WITH THE SOVIET UNION, A GROWING NUMBER OF NATIONS NOW POSSESS INVENTORIES OF MODERN ANTI-SHIP MISSILES, CHEMICAL WEAPONS CAPABILITY, AND OTHER ADVANCED WEAPONRY.

THE NAVAL COMBATANTS BIW HAS DEMONSTRATED A WORLD-RENOWNED PROFICIENCY BUILDING AND REPAIRING ARE CAPABLE OF DEFENDING AMERICAN LIVES AND INTERESTS AGAINST THOSE REMAINING REAL WORLD THREATS. AS PART OF THE MODERN NAVY, THE ARLEIGH BURKE CLASS DESTROYER WILL PROVIDE THE ABILITY OUR NATION CONTINUES TO REQUIRE FOR RESPONDING FLEXIBLY TO CRISES AROUND THE WORLD.

HOWEVER, AMERICAN WORKERS AND THE BUSINESSES THAT EMPLOY THEM CAN COMPETE ON THE WORLD MARKET IF GIVEN A FAIR CHANCE. THAT ASSERTION APPLIES TO THE DOMESTIC SHIPBUILDING INDUSTRY. BIW, IN ITS MORE THAN CENTURY-OLD EXISTENCE, HAS CONSTRUCTED MANY OF THE WORLD'S GREAT MERCHANT SHIPS, INCLUDING 17 SINCE 1968, AND WOULD TAKE ADVANTAGE OF AN OPPORTUNITY TO DO SO AGAIN. DEPENDING ON THE OUTCOME OF ANNUAL FUNDING AND DUAL-SOURCE COMPETITION IN THE AEGIS DESTROYER PROGRAM--BIW COULD HAVE CAPACITY TO PURSUE COMMERCIAL SHIP CONSTRUCTION AND REPAIR PROJECTS. PRACTICALLY SPEAKING HOWEVER, DESPITE PROJECTED UPSWINGS IN WORLDWIDE MERCHANT SHIPBUILDING, THAT OPPORTUNITY DOES NOT EXIST TODAY FOR AMERICAN SHIPYARDS.

NAVY WORK REPRESENTS NINETY-EIGHT PERCENT (98%) OF THE WORKLOAD IN PRIVATE US YARDS. THAT DOMINATION IS DUE LESS TO THE RECENT AND ROBUST NAVAL MODERNIZATION PROGRAM, THAN IT IS TO THE COMPLETE DISAPPEARANCE OF A COMMERCIAL SHIPBUILDING MARKET. NO ONE SHOULD BE UNDER THE IMPRESSION THAT US SHIPBUILDERS SHUNNED COMMERCIAL WORK IN THE LAST DECADE, OR OPTED TO PERFORM WORK ONLY FOR THE NAVY. THE FACT IS THAT COMMERCIAL OPPORTUNITIES HAVE BEEN PATHETICALLY FEW AND FAR BETWEEN.

MUCH OF THE BLAME CAN BE ATTRIBUTED TO HEAVY FOREIGN GOVERNMENT SUBSIDIZATION AND TRADE PRACTICES FOREIGN YARDS EMPLOY. WHILE TODAY THE AVERAGE US SHIPYARD LABOR RATE REGISTERS BELOW COMPARATIVE RATES IN THE MAJOR EUROPEAN YARDS AND ONLY SLIGHTLY ABOVE THAT OF JAPAN, US YARDS GARNER LESS THAN ONE PERCENT OF COMMERCIAL SHIP ORDERS WORLDWIDE.

DESPITE A ROBUST NAVAL SHIPBUILDING PROGRAM DURING THE 1980'S, MORE THAN ONE THIRD OF US SHIPBUILDING FACILITIES IN PLACE EIGHT YEARS AGO ARE NO LONGER IN OPERATION. NAVY WORK ALONE, EVEN DURING THE RECENT DEFENSE BUILD-UP, HAS NOT BEEN ENOUGH TO SLOW THE DETERIORATION OF THE US SHIPYARD BASE OR OF ITS VITAL DOMESTIC SUPPLIER BASE. FOR EXAMPLE, ONLY ONE YARD ON THE ENTIRE WEST COAST IS ENGAGED TODAY IN MAJOR SHIP CONSTRUCTION. THE DECLINE IN SHIPYARD EMPLOYMENT HAS BEEN DEVASTATING WITH MORE THAN 60,000 JOBS LOST.

THE PRIMARY REASON OUR SHIPYARD INDUSTRIAL BASE DECLINED WAS NOT DUE TO INEFFICIENT MANAGEMENT OR POOR WORK HABITS. IN LARGE PART IT MARKS A WAVERING COMMITMENT TO THE FEDERAL GOVERNMENT'S TRADITIONAL ROLE IN PRESERVING THIS VITAL NATIONAL ASSET IN THE FACE OF AGGRESSIVE PRACTICES BY OTHER MARITIME NATIONS.

DETERMINING AN EFFECTIVE FEDERAL RESPONSE TO THE IMPACT OF DECLINING DEFENSE BUDGETS ON KEY INDUSTRIES IS NOT AN EASY TASK. LEGISLATION RECENTLY INTRODUCED IN THE HOUSE BY REPRESENTATIVE OAKAR, HR 3999, THE ECONOMIC STABILIZATION, ADJUSTMENT, AND INDUSTRY CONVERSION ACT OF 1990, LOOKS LIKE A STEP IN THE RIGHT DIRECTION.

IDENTICAL LEGISLATION HAS NOT BEEN INTRODUCED IN THE SENATE. SENATOR PELL HAS INTRODUCED S. 2097 ON WHICH HE TESTIFIED EARLIER. S. 2097

CONTAINS SEVERAL ELEMENTS AKIN TO THE OAKAR BILL, BUT ALSO HAS PROVISIONS THAT IN MY VIEW COULD ACTUALLY HAMPER A DEFENSE COMPANY'S ABILITY TO DIVERSIFY AND COMPETE.

HR 3999'S EMPHASIS IS ON PROVIDING RESOURCES AND INCENTIVES, PRIMARILY TO COMMUNITIES AND DISPLACED WORKERS. THAT PHILOSOPHY WILL ENCOURAGE ECONOMIC DIVERSIFICATION AND HELP PRESERVE JOBS. THE BILL'S PROVISIONS FOCUS PLANNING AND WORKER ASSISTANCE RESOURCES AT THE LOCAL LEVEL AND ENCOURAGE BROADER LABOR-MANAGEMENT COOPERATION. IT IS AT THE LOCAL LEVEL, NOT IN THE FEDERAL BUREAUCRACY, WHERE THE HUMAN IMPACT WILL BE EXPERIENCED AND, WITH THE RIGHT RESOURCES BROUGHT TO BEAR, MITIGATED.

BILLS INTRODUCED BY SENATOR PELL AND REPRESENTATIVE WEISS WOULD ACTUALLY EXPROPRIATE A PERCENTAGE OF A CONTRACTOR'S REVENUES WHEN THOSE SAME FUNDS COULD, AS IN THE CASE OF BIW, BE APPLIED TO CONSTRUCTING MODERN, COMPETITIVE FACILITIES. THESE TWO BILLS ALSO MANDATE THE ESTABLISHMENT AND INDUSTRY FUNDING OF "CONVERSION" PLANNING OFFICES WITHIN PRIVATE DEFENSE PLANTS. CENTRALIZED ECONOMIC DECISION-MAKING IS A PROVEN FAILURE. NO READILY APPARENT RATIONALE EXISTS FOR THIS MANDATE. IT SEEMS TO PRESUPPOSE THAT MANAGERS OF DEFENSE COMPANIES HAVE LITTLE OR NO INTEREST IN THE FUTURE AND UNDERTAKE NO PLANNING OR MARKETING ACTIVITIES.

OUR NATIONAL FOCUS MUST BE ON REPLACEMENT MARKET AND JOB CREATION, NOT LENGTHY SUBSIDIES FOR UNEMPLOYED ENGINEERS OR MECHANICS.

NO SINGLE DEFENSE ADJUSTMENT OR ECONOMIC CONVERSION BILL CAN, BY ITSELF, PROMISE SUSTAINED EMPLOYMENT FOR WORKERS IN AMERICA'S SHIPYARDS OR OTHER KEY INDUSTRIAL SECTORS. THAT WOULD IN FACT BE AN UNREASONABLE EXPECTATION. A WELL-CRAFTED BILL CAN HELP THOUGH TO LESSEN THE DISLOCATION ALREADY BECOMING VISIBLE FROM THE DOWNTURN IN DEFENSE.

THERE ARE A NUMBER OF SPECIFIC INITIATIVES BEFORE CONGRESS TO REVITALIZE THE US COMMERCIAL SHIPBUILDING AND REPAIR MARKETS. A RESURGENCE IN THAT MARKET WOULD MAKE FOR THE MOST EFFICIENT AND LEAST DISRUPTIVE DIVERSIFICATION FOR BIW AND OTHER DOMESTIC YARDS. COMMERCIAL SHIP CONSTRUCTION GENERALLY EMPLOYS FEWER WORKERS FROM A SMALLER RANGE OF

TRADES THAN DOES THE CONSTRUCTION OF SOPHISTICATED NAVAL VESSELS. HOWEVER, IT DOES OFFER THE MOST PRACTICAL ALTERNATIVE FOR THE FUTURE OF OUR COMPANY AND ITS WORKERS.

THOSE INITIATIVES INCLUDE: OUR INDUSTRY'S UNFAIR TRADE PRACTICES PETITION TO END FOREIGN SHIPBUILDING SUBSIDY PRACTICES AND CREATE A LEVEL PLAYING FIELD; OIL SPILL LEGISLATION MANDATING DOUBLE HULLS FOR TANKERS CALLING AT US PORTS; EXECUTION OF LAST YEAR'S CONGRESSIONAL SEALIFT SHIPBUILDING PROGRAM; ACTION ON THE RECOMMENDATIONS OF THE BENNETT COMMISSION ON MERCHANT MARINE AND DEFENSE; AND, EFFORTS TO REVERSE EROSION OF THE REQUIREMENT THAT ALL MERCHANT VESSELS CALLING EXCLUSIVELY AT US PORTS BE CONSTRUCTED AND MODIFIED IN DOMESTIC YARDS.

THOSE INITIATIVES REQUIRE LITTLE IN THE WAY OF NEW FEDERAL EXPENDITURES. THEIR ENACTMENT WOULD, HOWEVER, REQUIRE POLITICAL WILL AND ACTION BY THIS CONGRESS AND THE WHITE HOUSE. ENACTMENT COULD MAKE THE DIFFERENCE IN OUR INDUSTRY'S ABILITY TO SURVIVE THE TRANSITION PERIOD AND MAINTAIN JOBS FOR SKILLED AMERICAN SHIPYARD WORKERS. THEY REPRESENT SOUND OPPORTUNITIES TO INVEST A SMALL PORTION OF THE PEACE-DIVIDEND IN A MANNER WHICH HELPS SUSTAIN EMPLOYMENT AND THE DEFENSE MOBILIZATION BASE.

CONTINUATION OF NAVY SHIPBUILDING, COUPLED WITH ENACTMENT OF THESE MARITIME, TRADE AND INVESTMENT PROPOSALS, WOULD PROVIDE BIW A COMPETITIVE CHANCE TO SUCCEED IN THE UNCERTAIN DAYS AHEAD--AND OUR WORKERS THE OPPORTUNITY TO PASS THEIR WORLD-RENOWNED SKILLS TO ANOTHER GENERATION OF MAINE SHIPBUILDERS.

MR. CHAIRMAN, I HOPE THESE COMMENTS HAVE CONTRIBUTED TO THE SUBCOMMITTEE'S CONSIDERATION OF THIS VITALLY IMPORTANT ISSUE. THANK YOU AGAIN FOR THE OPPORTUNITY TO APPEAR HERE TODAY. I WOULD BE HAPPY TO ANSWER ANY QUESTIONS.

Senator BINGAMAN. Thank you very much for your testimony.

Let me ask each of the witnesses to comment on something. We have had a recent experience here in the Senate where an effort to assist displaced workers was made by Senator Byrd in connection with the Clean Air Act, and he proposed that coal workers, coal miners who lose their jobs as a result of the Clean Air Act's requirement that we move to lower sulfur coal, that those coal workers and coal miners be provided some level of adjustment income and other benefits. That failed here in the Senate; I guess the problem, as I see it, Senator Byrd was talking about 5,000 coal miners.

We are now talking—I think, Mr. Samuel, you suggested that perhaps there are a couple of hundred thousand people in the defense industry who will need retraining, some kind of income support, health benefit support. Those people are, I think, by all measures more skilled, more flexible, more able to move to other positions than most coal miners would be expected to be just by virtue of the skill levels required.

If we could not do it for coal miners, is it realistic to think that we could do that for the kind of skilled, upscale kinds of individuals income-wise that we are talking about here, Mr. Pace?

Mr. PACE. Senator, you are really asking in my view a political question more than a technical question. I agree with you that in view of what happened to Senator Byrd's proposal it may be unlikely that such a proposal just translated one-to-one will pass.

On the other hand, looking at training in general my experience with training is one negative and one positive. Some of the Government training for the disadvantaged people a decade or so ago was really not in my view effective training because they were paid to take some training with no job connected thereafter, so the training could have been in the wrong direction. And I worry that if we go into a massive training program for those unemployed from a defense industry, it could be misdirected.

I would suggest on the positive side the best training programs that I have seen are those that were put forward by certain States. As an example, in trying to attract manufacturing to Georgia, they did not train their people until the industry was willing to come in with a plant and then they brought the plant in and made the commitment, and the State committed to train the people for certain skills at certain levels, et cetera, et cetera.

Now, other States have done the same thing, and I do not know that Georgia was the first, but that is an example where you are training the people effectively for a specific job that when they finish successful training, they go into the job, and you have a job. That to me is far more effective than just a broad training for upgrading and "going into commercial." I do not know how you would train a machinist from machining a submarine part to machining an automobile part.

I do not know that any training is really necessary. I think it could become just a subsidy and in that case it should be in the unemployment compensation.

Senator BINGAMAN. Mr. Samuel.

Mr. SAMUEL. I think there are two ways of looking at this. From a political point of view, of course, you are dealing with two or three hundred thousand workers, and you might get a good deal

more support coming from a lot of States than you would on behalf of 5,000 coal miners who come from two or three States.

Senator COHEN. A bigger price tag, too.

Mr. SAMUEL. But there would be more interest involved. On the other hand, I guess I am impressed by Senator Riegle's question regarding the liabilities that the United States faces in competing with Japan, and one of the primary liabilities he mentioned was our failure in developing human resources to match the human resources of Japan and some of our other competitors enjoy.

It seems to me that here we have the supply, the reservoir of workers that can meet so many of our needs of manufacturers who complain they do not have trained workers, they do not have workers who are attached to the labor force with good work habits. Here we will have 100,000, 200,000, or 300,000 workers, and I notice last week that three major companies announced elimination of 10,000 jobs already. It is already starting all around us. We have the available reservoir of workers who can meet some of our human resource needs.

It seems to me that if the Congress does not recognize that and provide incentives and provide the capabilities for these workers to move into these jobs that are so desperately needed that it is a waste of an asset. I do not think it is a cost. I think it is an asset which we would take advantage of.

Senator BINGAMAN. Mr. Haggett, did you have a statement?

Mr. HAGGETT. My brief reaction was that Senator Byrd's recommendation was seen as going too far, as excessive, and there has to be a better way.

With respect to defense contractors, I think the key is finding ways to create alternative jobs as opposed to finding ways to retrain people over an extended period of time or paying them for not working.

Mr. PACE. If I may add one point, Senator, I think it is in Senator Pell's bill as proposed. One of the elements was to propose money for the movement of workers geographically from one place to another. That, to me, could be an attractive and effective thing because if you have a small town where a defense plant goes down, the ability to find work for those people—it is the job creation more than the training of the people that is the problem, but if there are jobs available elsewhere and you could provide some subsidy for their transfer or their movement, that could be very helpful.

Senator BINGAMAN. Let me defer to Senator Cohen now for any questions or statement he has.

Senator COHEN. First, let me welcome my friend, Bill Haggett, who came out of the fog and into the rain in Washington.

I did not hear the previous panel and did not bite my tongue or lip to draw blood, but I am sure that I will read the record and have that same reaction.

First, I would like to direct a question to Mr. Pace. You indicated that there is a different culture, obviously, for those who engage in defense work as opposed to those in commercial production because of added oversight, added regulation and simply an unbearable amount of paperwork to contend with, et cetera, and that you could switch from defense contracting to commercial production

but the switch from commercial to defense is rather difficult, if not impossible.

Mr. PACE. I think you have the problem with the culture of the individuals or the organizations either way. What I stated was a broad general statement which, of course, like any general statement has certain limitations and exceptions.

Mr. Haggett has already pointed out where he is building ships, and they want more commercial ships of the same general nature. This can be done; or if, like at Boeing, where you are building military aircraft, cargo aircraft, and there is a transfer there. If someone wanted some commercial submarines, we could probably do those at Electric Boat, too, but the probability is very low.

I think that the issue is the people have that capability but the culture is different. If you really do this, you need to put them into the organization which has the commercial culture.

It is equally difficult to switch the other way. I think it is difficult to go either way. There is a transition period, but if the commercial person comes into the defense organization, the defense organization will train him in and of itself.

Senator COHEN. I do not know if you followed some of the proposals recently, but I think there is a change in attitude within the Department of Defense itself. There have been a number of recommendations which would seem to move some of the regulations or over regulations closer to the commercial side of things, relying upon marketplace discipline as opposed to certifications that are now required within the defense industry. So you may see a greater commonality of cultures that eventually evolves as a result of seeing what has been done in the field of defense contracts.

Mr. Haggett, I would just like to turn to you for a moment and talk about your statement regarding one merchant ship since 1984 produced in the United States versus roughly 400 in Japan. I traveled to the Far East the last time with Senator Bob Dole. We took a delegation, and we went to a variety of countries, ending up in Japan and in Korea.

In Korea, by way of example, I think they were paying at that time in 1985 their shipworkers in Pusan $1.88 an hour.

Mr. SAMUEL. That is why there are riots now.

Senator COHEN. I assume that that has gone up somewhat since 1985, but nonetheless, assuming it has even doubled or quadrupled, how does that compare with, let us say, Bath Iron Works or even General Dynamics?

Mr. HAGGETT. Labor rates in Korea are very low by comparison with us. If $2 an hour is the labor rate, then that compares to the labor rate in our shipyard of about $12 an hour.

The worldwide gap that existed in American labor rates 10 years ago has changed dramatically, however, since then. Labor rates in our shipyards now are lower than in modern European yards. Japanese labor rates are getting very close to labor rates in the shipbuilding industry in the United States. Korean labor rates tend to be an exception. Mainland China is another exception where shipbuilders operate with very low labor rates.

Senator COHEN. Let me focus. We are competitive with Europe, then, as far as shipbuilding is concerned. We are not competitive at this point with Japan.

What is the difference in terms of the subsidies that they provide that makes the United States noncompetitive? There is obviously a great demand for commercial ships, merchant ships. The hundreds that are out there are old. We have had some experience with the single hulls and so forth.

There is a great demand. We probably have a greater capacity, productive capacity, for commercial ships than any other country in the world today maybe short of China. I think we have to focus on the difference.

What are they doing in Japan that we are not doing in the United States, and why is the field so uneven that we cannot compete 400 to one?

Mr. HAGGETT. Let me quickly react to what is going on in northern Europe, for example. In northern Europe the direct shipbuilding subsidies which were 28 percent a short time ago are now down to about 20 percent.

Senator COHEN. Are those construction subsidies?

Mr. HAGGETT. Yes, shipbuilding subsidies.

In Korea, where you mentioned the low labor rates, Korean shipyards have excellent facilities, but they undersell the market. They buy into the market. And the Korean government has established a reputation for bailing its shipbuilding industry out and making it whole.

The Japanese shipbuilding industry comes together in a way that would violate our antitrust laws in this country. They control the market. Shipbuilding is a very important industry in Japan. And the Japanese government tends to protect its shipbuilders and its ship operators against others. And that is one of the concerns that U.S. ship building industry has with respect to Japan, and one of the unfair practices that our industry is trying to straighten out.

Japanese shipbuilders have also been bailed out when they find themselves in trouble. There are a variety of different forms of subsidies and protectionist practices that are employed.

And American shipbuilders are really looking for a level playing field. If we can establish that level playing field I think that American shipbuilders can quite quickly move back into the world shipbuilding market.

Senator COHEN. Thank you, my time has expired.

Senator BINGAMAN. Mr. Pace, let me ask you this. I think your comments were that the conversion issue should best be handled first by bringing down the level of defense expenditures relatively slowly so that we do not have major disruptions, and second, assisting individuals so they can move.

What about the proposals that we have from a variety of sources to also assist communities that are impacted very adversely? Is there something significant that government can do or should try to do in that respect? Or is that something that will either happen or not regardless?

Mr. PACE. Well, I think that is a difficult question from kind of an equitable standpoint. My sympathy would go for those communities in the same way it goes for the individual employees. I do not know just exactly what kind of help that you would be able to give those communities that would not in some way establish just a

flow of dollars that would be very difficult at some point in time to wean off.

But I would have no objection to the Congress doing something in that nature, comparable to doing something as far as the individual employees are concerned.

To be very frank, if you look at it from an equitable or clean sheet of paper standpoint, the defense companies have benefited over the years by the defense market, so have the communities, and so have the employees. So all three have benefited and all three will go through some sort of contraction here.

I do not think there is a lot of help that should be extended to the defense companies themselves, other than a correction of difficulties or playing fields, or slowing this thing down in general so that the transition and the numbers of people would come out at a rate that could be handled and absorbed. I do not think there should be a lot that should be done for the companies.

I think unemployment compensation and a proper degree of training, if it is needed, on the Georgia model, the transfer of people, some sort of subsidy to make it easy for them to get jobs and become productive, maybe in some other geographic area. And if there is some specific element of the local government that is being damaged and you could constrain that in some way so it does not just proliferate, I would have no objection to that. But I do not know enough about the local government.

Senator BINGAMAN. Well, would it make sense, for example, for the Federal Government to provide very small sums to communities to hire expert assistance in trying to plan what those local communities are going to do once those changes occur? Or does that not make sense?

Mr. PACE. In the prior panel there was quite a bit stated about planning and I am great believer in the free market. I think to the extent that the companies can convert by bringing in commercial products to whatever plant and business they have, to the extent that they can do that and be effective, they are highly incentivized to do so. I do not think that you need a lot of governmental help for those companies to do that.

I think that some of the planning concepts that have been proposed not only here but broadly are that somehow you can get a planning organization or department of the company or a planning organization in the department of the city or of the union and they are going to create something. I have a hard time seeing how that is practical.

I think that the free market will bring to bear any commercial products, et cetera, that a unit and the organization or the plant is capable of handling. And I am not a great believer in that type of centralized planing

Senator BINGAMAN. Is there any other comment either of you have?

Mr. SAMUEL. Yes. I have a little trouble with that.

It seems to me that in the free market the most successful corporations are those which have important planning functions within their companies, I am sure, including Mr. Pace's. Planning, as a concept, whether it is done here or there, or elsewhere, is done by people and when they are employed by corporations they are plan-

ning for the future of the corporation. When they are employed by communities, I hope they are planning for the future of the community. When it is done by the Federal Government, it is looking at what are the prospects for the future of the country as a whole.

It seems to me that planning should not be considered as good for some and bad for others. It is absolutely essential at a time of rapid change, as the conversion process is going to bring in. And if we do not do some kind of planning it is going to be absolute chaos. And worse than that, there is going to be a tremendous amount of waste.

There are going to be people unemployed who are needed to work. There are going to be communities which are disrupted at great cost, which do not have to be. There are going to be companies which go out of business which do not have to be, which have real assets which can be employed in meeting the international competitive situation that we face. It seems to me that planning is an absolutely necessary process for that within the free market, and every company does it, and so should the Government.

Senator BINGAMAN. Are you saying it is appropriate for the Federal Government to provide assistance to local government so they can do planning to react or respond to the changes that are occurring, or are you also suggesting the Federal Government should do something to assist or direct defense companies to plan?

I would assume, maybe incorrectly, that defense companies, as you say, have a significant planning capability at the present time, and they either make the right or wrong decisions. Which of those two are you advocating?

Mr. SAMUEL. I am not sure they are mutually exclusive, Mr. Chairman. I think certainly helping local communities plan, providing incentives for them to plan is useful. If there are defense companies which seem to be working out their problems on their own, so much the better.

I think Gordon Adams in his testimony earlier pointed out that every situation is different and we should have the kind of system which is flexible enough to accommodate to the differences in corporations and in communities. If there are some companies which for some reason are unable to move on and represent useful assets, then it seems to me the Government should step in and provide the kinds of incentives which are necessary to make sure that we, the community as a whole, are not the losers.

Senator BINGAMAN. Mr. Haggett, did you have a comment on this?

Mr. HAGGETT. Yes. I would like to respond to that comment.

I think that you, the Government, need to look specifically at the situation that exists in a given area. Shipyards have closed recently in Seattle, Los Angeles and Boston. My impression is that the impact on those cities and those communities was relatively small. Probably half the people in the cities did not know that the shipyards had ceased to exist. Those who worked in the shipyards were directly impacted, but the overall community did not suffer.

If Newport News in Virginia or Electric Boat in Groton, Connecticut or Bath Iron Works in Bath, Maine were to cease to exist, the impact would be catastrophic in those communities. For example, we employ 11,600 people. The population of our city is about

11,000. If Bath Iron Works stops operating, a region in Maine of about 30 miles would be devastated. I think Senator Cohen would agree with that.

Obviously, that area would need significant assistance in every form. The company is focusing its planning on survival. We are not planning for a going-out-of-business kind of scenario, but someone needs to be giving some thought to that. Obviously assistance would be needed in a case like ours.

Senator BINGAMAN. Thank you very much. Senator Cohen.

Senator COHEN. Mr. Haggett, let me come back to your statement about the shipyards having gone out of business. What has been the experience of those shipyards that were once within the defense industry that have gone out of business? What has happened to the facilities?

Mr. HAGGETT. Senator, as part of the Armed Services Committee's continuing thoughts about defense mobilization and pnasing down and whether or not we may ever have to restore the capability, do not for a minute lose sight of the fact that you cannot slow down a shipbuilding operation and quickly restore it. The skills just do not come back quickly. As a matter of fact, they may never come back.

If you shut the shipyard down, what you are likely to get on that land is condominiums or a boating facility or that sort of thing. Shipyards for the most part are built on land that is now viewed as valuable. The minute the shipyards go out of business some other user moves in.

Building a new shipyard is an extremely costly process. Very few people would ever want to start today. I cannot imagine anyone building a new shipyard in this country, and trying to restore a shipyard that has been permitted to slow down or close would be extremely costly. I would not consider that a viable national defense mobilization asset in my mind.

Senator COHEN. You were a member of the Bennett Commission on Merchant Marine. Could you tell us what the major recommendations were of that commission?

Mr. HAGGETT. The Commission on Merchant Marine Defense, which was established by President Reagan, studied merchant shipbuilding in this country for a period of 2 years. At the time we completed our study, our conclusion was that the American Merchant Marine was totally inadequate to support national defense requirements. That, though, was in the era prior to major changes in Eastern Europe and the Soviet Union.

Looking at that issue today in light of what has happened with respect to world politics, the Commission might have come to a different conclusion. I think the Commission today would tell you that they feel that the American Merchant Marine is still too small to sustain even a minimal military effort. It is not adequate to support the country's economy. The Commission recommended that a balanced program be developed that would stimulate the need for construction of at least as a minimum 10 to 12 merchant ships in this country per year, a program that would make American flagship operators healthy and a program that would permit American flag operators to purchase some ships abroad.

So we put together a very comprehensive program, and we did it with the support of the President and under the direction of Representative Charlie Bennett.

Senator COHEN. In order to stimulate the private sector, does that tie in directly with unfair trade practice?

Mr. HAGGETT. Yes. We dealt directly with unfair trade practices, and that has been an issue of on-going concern, as you know.

Senator COHEN. Do you disagree with the decision recently to take Japan off the 301 hit list, so to speak?

Mr. HAGGETT. Yes, I do. I assume that there were reasons why that was done. Speaking selfishly for the American shipbuilding industry and ship-operating industry, I do not think that that should have been done.

Senator COHEN. You mentioned, American flag operators and American flag operators healthy. Does that mean—are those words that translate into mandating that ships that port primarily in U.S. ports or delivery primarily to U.S. ports be built in the United States? Is that part of the recommendation?

Mr. HAGGETT. No, not all of the ships.

Senator COHEN. A big percentage?

Mr. HAGGETT. The Commission on Merchant Marine and Defense was talking about a balanced program that would provide that some ships be built in the United States and permit some ships to be purchased abroad.

Senator COHEN. Now, you are a free enterpriser, and one of the first charges made when you start mandating that certain ships be built not only by Bath Iron Works but built in America, the first cry is protectionism. What is your answer to that?

Mr. HAGGETT. I would be willing to let the American shipbuilding industry take its chances in the world market, but I would ask you, or someone to assure us that we truly have free trade in the world market and a balanced playing field. Give us that and we will have to take our chances.

Senator COHEN. So what you would recommend is that we pursue very vigorously an unfair trade practice petition against Japan and other countries who are engaged in the subsidization of their shipbuilding industry?

Mr. HAGGETT. Yes.

Senator COHEN. That is all I have.

Senator BINGAMAN. Let me ask just one other question. Mr. Samuel, you state in your testimony, and in your oral statement as well, that we should start with a plan and a commission representing government, labor, business and the community to develop a plan.

We are accused of setting up too many commissions. What do you perceive that this commission would do? Could you elaborate on that a little bit, and why you think that it makes sense to establish another commission at this point, and what kind of time frame are we talking about here? These changes, as you pointed out in your statement, are happening quickly, and how realistic is it for us to set up a commission to do a study and report back to us?

Mr. SAMUEL. Senator, I think many of the major programs in this country that this country takes a good deal of pride in have resulted from the work of commissions—the thoughtful people who

have committed themselves to developing plans, programs and policies—and it seems to me it applies at this particular time, which for many people and many communities represents a crisis. For example what you are doing today, I think, has been immensely valuable—at least the first panel. I will not say anything, out of modesty, about this panel.

But the fact is that would it not be more useful if you could call upon a group of representative people who are skilled and experienced to put together some plans and programs that this committee could depend upon in developing legislation? People who are acquainted with the issues, who know how the Defense Department operates, who know some of the problems that workers will face and can give you the kinds of good advice that will produce good legislation. I do not think it is anything magical. It is just simply using our resources in the best way possible and coordinating them.

Senator BINGAMAN. Do either of the other witnesses have a point of view on that suggestion?

Mr. PACE. I might just say that I do not feel strongly one way or the other on that. I have no objection to a good, analytical, balanced commission to study the issues. I would suggest that it be balanced in all ways and all viewpoints be heard. Other than that, I do not have any thought one way or the other.

Senator BINGAMAN. Mr. Haggett, did you have any thoughts on this?

Mr. HAGGETT. No. I would just hope that for every college professor you would put one industrialist on the commission.

Mr. SAMUEL. Amen.

Senator BINGAMAN. All right. We do think the hearing has been useful. I think the testimony of this panel has been very useful in giving a perspective on the set of issues we are dealing with here. We have not determined yet as to what additional hearings will occur on this specific issue. We are going to digest what we have heard today and try to make an intelligent decision on that. I know several of you have come from quite a distance, and we appreciate you coming very much.

The hearing is adjourned.

[The following letter has been inserted for the record by the National Security Industrial Association.]

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W. H. Robinson, Jr.
*President*

18 May 1990

The Honorable Jeff Bingaman
Chairman
Subcommittee on Defense Industry and Technology
Committee on Armed Services
United States Senate
Washington, D. C. 20510

Dear Mr. Chairman:

The National Security Industrial Association (NSIA) appreciates the invitation extended in your letter of 20 April to address issues associated with defense industry adjustments resulting from the easing of tensions with the Soviet Union. At this time, we have limited our response to how the impacts of reductions in defense spending may be mitigated through public and private actions, and the adequacy of existing planning by government to address defense adjustment issues. We would request that this letter be included in the record of your 4 May hearing on economic conversion.

Last February, the Procurement Planning Committee of NSIA established an Ad Hoc Group on Downsizing of the Defense Industry. In conducting its assessment of the issues involved in downsizing of the defense industry, the Ad Hoc Group approached the topic of economic conversion as only one among a number of policies which rely on market forces and planning to minimize the dislocations which will occur during significant downsizing of the defense industry.

NSIA believes that, even in the context of budget reductions, government should cushion the process of economic conversion by providing stable procurement programs and policies to meet the needs of national security. In doing so, government would be setting the parameters for rationalization of the defense industry. The adjustments imposed by downsizing and economic conversion also would be helped if government would apply the same longterm, stable planning and funding principles to meeting the nondefense requirements of international competitiveness, including space, infrastructure, environmental cleanups, and the education and health of the workforce. Finally, government must allow defense contractors the freedom to adjust to rapidly changing market conditions without imposing restrictions, prior conditions, and undue regulatory and financial burdens.

GOVERNMENT ANALYSIS AND ACTION

NSIA members believe the first duty of the government, and industry, is to provide for a strong national defense. This requires government policy makers to develop our national security objectives, redefine the threat and set appropriate levels of force structures. From this baseline it will be possible for Congress to make appropriate multiyear commitments to fund defense requirements. If properly executed, in a timely manner, such planning should assure the nation of a strong defense within affordable budgets.

We also are convinced that such planning is a prerequisite for efficient reform of the defense acquisition system. Unless the government customer knows why it is buying what it is buying, it is unlikely that the customer will know how to buy efficiently and with the best possible value to the taxpayer. Experience

during the last forty years has demonstrated repeatedly that ill-defined missions lead to conceptually weak systems replete with costly changes and overruns. Additionally, well-defined weapons systems are necessary if the government is to meet an oft-stated objective of relying upon the commercial industrial base to meet more defense requirements. Such increased reliance upon the commercial base will strengthen our national competitiveness and industrial efficiency.

While there is nothing really new in emphasizing upfront planning, it does set the parameters of the defense market. Clear dimensions of the market are invaluable in helping defense contractors plan to respond to the market, to compete or withdraw, to invest or to shift investments to other more promising endeavors.

## CHANGES IN PROCUREMENT POLICY AND ACQUISITION STRATEGIES

In conducting its defense business, the government should develop and implement procurement policies and acquisition strategies which are cognizant of and consistent with the objectives of economic conversion and preservation of an adequate defense industrial base. Essentially, this means assuring adequate financial returns to contractors on existing business with the government and removal of limitations on cost recoveries from government business to finance new nondefense business investments. For example, technical accounting rules applicable to recovery of independent research and development (IR&D) costs have restricted defense contractors' ability to participate in research and product development consortia, including joint efforts to improve manufacturing processes in order to compete internationally.

To facilitate the transition of today's defense industry, regulatory and statutory measures must be taken. Such actions may include provisions for favorable settlements of termination claims; elimination of any ceiling on the recovery of IR&D expenditures; adoption of profit policies and changes to acquisition strategies which will accommodate the proposed emphasis on research, development and testing without going into full production of new weapons systems.

## EQUITABLE TREATMENT OF CONTRACTORS IN EVENT OF TERMINATION/CANCELLATION OF CONTRACTS AND PROGRAMS

The protections normally afforded by current laws and regulations addressing the government's liability in the event of termination for convenience do not adequately address the collateral consequences of such actions, particularly when such instances will occur on a large scale. For example, there is no relief for the defense contractor whose costs of production under concurrent or collateral contracts is significantly increased due to the government's actions to downsize the business base over which companies can allocated fixed and other overhead costs; this is especially oppressive when such contracts are either capped or set at firm fixed price at the insistence of the government customer. There is no relief for the unallowability of amortization costs associated with idle capacity made excess by virtue of unilateral government action. Nor is there any provision for compensating the terminated contractor for opportunities forsaken or lost by virtue of having accepted the unilaterally cancelled government contract.

Considerations of equity, the future health of the defense industrial base, and economic conversion, require a thorough review of existing statutes, regulations and policies which will guide government contract actions during the significant downsizing of the defense industry.

## SUPPORT FOR DEFENSE TRADE

The government can also act affirmatively to enable defense firms to compete successfully in foreign military markets. The nation has no up-to-date defense trade policy. Transfer of technology is still driven by policy considerations predating the easing of tensions with the Soviet Union. Nor has our government yet established any financing support for U.S. defense firms' selling

efforts. As a result, we are forced to give up too much to foreign customers in the way of offset arrangements in exchange for market share.

Last year, the Defense Security Assistance Agency (DSAA) greatly expanded the base of international defense trade from which it recovers nonrecurring development costs funded by the government. As of 1 May 1989, recoupment of nonrecurring costs applies not only to "major defense equipment," as provided in the Arms Export Control Act, but to all domestic and international sales of nonmajor defense equipment including "derivative" items, those containing at least ten percent content identifiable as common to a defense item. Further compounding this levy on the international business of contractors is the fact that the government's unilateral determinations of recoupment costs cannot be challenged. Current recoupment policy must be reversed if U.S. industry is to have an opportunity to increase its competitiveness in international and domestic markets.

IMPEDIMENTS TO ENTERING COMMERCIAL MARKETS

The defense industry is confronted with various national security restrictions which further impede its ability to introduce technology developed for or having military applications into commercial markets, especially international markets. Relaxation of these barriers must be an essential element of the federal government's economic conversion policy. ,For example, many dual-use electronic items are subject to the Arms Export Control Act even when the items are manufactured primarily for commercial applications. The cumbersome, complex, and often, political process of obtaining approval for export licenses to the Soviet Union and former East Block nations obstructs the ability of U.S. firms to gain market share versus their foreign competitors. Finally, some Members of Congress and officials within the Executive Branch Departments and Agencies have sought to use export controls to protect domestic competitors and prevent defense contractors from entering into foreign commercial ventures. Except where there are legitimate national security concerns, such actions are counter-productive to efforts of defense firms to relieve domestic over-capacity by competing for nondefense business abroad.

COMMUNITY ADJUSTMENT ASSISTANCE

As a result of downsizing the defense industry, there will be some communities impacted by the loss of major defense businesses. They face an uncertain future. Predictably each community's response to the challenges will be unique to its circumstances. Government assistance, if required, should be generously tailored to the needs of individual communities. Whatever is done, there is no justification for burdening industry with contract surcharges or other similar levies and "taxes" to finance these assistance programs. Surcharges and additional taxes merely guarantee that any cash-short firms will fail at converting to nondefense business.

If government undergirds its economic conversion policies with a renewed commitment to the principle that business should be free to make necessary adjustments in response to market conditions, the transition of the defense industry to the post-Cold War era can be accomplished with a minimum of disruption in the lives of workers and communities.

NSIA and the Ad Hoc Group on Downsizing of the Defense Industry welcome the opportunity to discuss our views on these important issues with you and your Subcommittee at your convenience.

Sincerely,

Wallace H. Robinson, Jr.
President

[Whereupon the committee adjourned at 12:26 p.m.]

# DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1991

MONDAY, MAY 7, 1990

U.S. SENATE,
SUBCOMMITTEE ON DEFENSE INDUSTRY AND TECHNOLOGY,
COMMITTEE ON ARMED SERVICES,
*Washington, DC.*

## DEFENSE SCIENCE AND ENGINEERING EDUCATION PROGRAMS

The subcommittee met, pursuant to notice, at 2 p.m. in room SR-222, Russell Senate Office Building, Senator Jeff Bingaman (chairman of the subcommittee) presiding.

Committee members present: Senator Bingaman.

Professional staff members present: Frederick F.Y. Pang and William H. Smith.

Minority staff members present: Jonathan L. Etherton, professional staff member.

Staff assistant present: Melissa Ann Ramsey.

Committee members' assistants present: John Gerhart, assistant to Senator Bingaman; Melvin G. Dubee, assistant to Senator Byrd; and Charles G. Pearcy, assistant to Senator Lott.

### OPENING STATEMENT OF SENATOR JEFF BINGAMAN, CHAIRMAN

Senator BINGAMAN. The subcommittee will meet this afternoon to receive testimony on the administration's plans for strengthening the national effort to educate scientists and engineers, and how the Department of Defense and other mission agencies can support that effort.

There have been a great many studies performed by organizations such as the Office of Technology Assessment, the National Academy of Sciences and various private institutions addressing the outlook for the Nation's science and engineering work force. All project a decline in the number of new entrants into that segment of the work force and the number of people who seek science and engineering degrees.

This is in the face of a certainty of an increasingly complex environment to develop and manufacture ever more complex equipment both for military and civilian purposes. The requirements for scientists and engineers as one part of this work force are projected to increase—requirements are projected to increase in the next decade and beyond at a rate greater than we have previously experienced, even as our defense spending declines.

The National Academy of Sciences has found that to effectively increase the number of students taking science and engineering courses, there must be intervention at all levels of education, but especially at the pre-college level. The Department of Defense already has a wide range of programs in place designed to increase its science and engineering work force, and these efforts are commendable, but much more must be done to meet the unavoidable future challenge.

Dr. Alan Bromley, the President's science advisor, told me he is particularly concerned with the pre-college math and science education, since most students make their choice to pursue careers in these fields by the time they enter high school. He has also emphasized the need to attract far more minorities and women into these fields.

The 1990 Defense Authorization Act contained a provision expressing the sense of Congress that the Secretary of Defense should take appropriate actions to promote and encourage at the pre-college to post-doctoral levels an increase in the number of persons pursuing science, engineering and other technical studies.

The act further directed the Department of Defense to prepare and submit to Congress a report on existing and prospective Department of Defense programs to preserve and perpetuate an effective science and engineering work force. The required report was submitted late last month and describes a number of excellent activities already underway in the services and the Office of the Secretary of Defense that may form the basis for a more comprehensive Defense Department-wide coordinated program. At the national level, Dr. Bromley has made science and engineering education and training one of his major concerns. Both the Federal Coordinating Council for Science, Engineering and Technology and the President's Council of Advisors on Science and Technology are addressing the ways and means of improving science and engineering education in the United States.

Outside the Department of Defense many other Federal agencies have strong, on-going programs in science and engineering education. One of the strongest is in the Department of Energy, where Adm. James Watkins is providing leadership to encourage his laboratories to get involved in solving the science and math education shortfall facing the Nation. Various initiatives are now underway, including in my home State of New Mexico, with particular emphasis on pre-college and undergraduate education.

At this hearing this afternoon, our first panel will consist of Dr. Thomas Ratchford, the OSTP Associate Director for Policy and International Affairs, who will describe the views of the President's science advisor on the scope and dimensions of the overall problem that we face and the role of the various departments and agencies in solving it.

In addition, Dr. James Decker, from the Department of Energy, will join Dr. Ratchford on the panel to describe his organization's programs in promoting science and engineering education, especially the significant involvement of the national laboratories in supporting this effort. We welcome both of them this afternoon.

Our second panel is comprised of representatives from the two Defense Department Offices primarily responsible for Department

of Defense Science and Engineering educational activities. First is Dr. Ted Berlincourt, who is the Director of Research and Laboratory Management. He oversees much of the Defense Department funding provided through the university research and graduate fellowship programs that support undergraduate and graduate education. Joining him is Mr. Frank Cipolla, who is the Acting Deputy assistant Secretary of Defense for Civilian Personnel Policy. He is responsible for technical education and training of civilian personnel already in the Department of Defense.

Both were heavily involved in preparing the Defense Department's Report on Science and Engineering Education Activities of the Department of Defense that was recently forwarded to the Congress. [A copy of this report will be retained in the committee files.] We look forward to hearing their testimony in support of the administration's science and math education initiatives.

There may be other members of the Subcommittee who come in. We are not certain at this point, so why don't we go ahead with the first panel. Dr. Ratchford, if you want to go right ahead, we will start with you.

Let me just advise all of the witnesses if you could go through the main points of your testimony and summarize what you have to say as best you can, I think that would be most useful and that would leave some time for questions. Take 8 or 10 minutes, however long you need. Thank you for being here.

## STATEMENT OF J. THOMAS RATCHFORD, ASSOCIATE DIRECTOR FOR POLICY AND INTERNATIONAL AFFAIRS, OFFICE OF SCIENCE AND TECHNOLOGY POLICY

Dr. RATCHFORD. Thank you, Mr. Bingaman. It is a distinct honor and pleasure to testify before you this afternoon on the matter of science and engineering education in the United States. The administration shares with the subcommittee its concerns over the decline in the science and technology work force over a period of many years.

The problem is both qualitative and quantitative. We are already facing a shortage of well trained, top-notch scientists and engineers within the Federal Government and our universities and, increasingly, within the private sector. Furthermore, an adequate supply of excellent future scientists is in jeopardy because the numbers of young people of college age is declining, and the percentage of the students interested in science and engineering is likewise dropping.

The President and this administration are fully aware of problems we face, and we have made significant strides in addressing science and mathematics needs through the National Education Summit, the agreement on national education goals, and through the fiscal year 1991 budget for science and mathematics education.

### DEVELOPING NATIONAL EDUCATION GOALS

Last fall the President convened the Nation's governors for the National Education Summit in Charlottesville, Virginia. This had not been the case since President Roosevelt convened a similar summit of governors to deal with the banking crisis during the depression.

Following the summit, the President and governors have agreed upon national education goals and objectives to be reached by the end of the century. Science and mathematics are central to those goals, and specifically are mentioned in two of them. First, the goal that says that American students will leave grades 4, 8, and 12 having demonstrated competency in challenging subject matter including mathematics and science and, perhaps most important, by the year 2000 U.S. students will be the first in the world in science and mathematics achievement.

The goals form a framework for national policy and strategic investments in science, mathematics, technology and engineering education.

### FISCAL YEAR 1991 BUDGET FOR SCIENCE AND MATHEMATICS EDUCATION

Through the fiscal year 1991 budget, the President has placed high priority on programs and funding for science and mathematics education. The 1991 budget proposes over $1 billion in direct spending in five agencies for science, mathematics and engineering education, an increase of 26 percent above 1990.

These programs are designed to advance general scientific literacy and mathematical numeracy and to prepare the next generation of scientists, engineers and technicians. This funding total does not include very large amounts for graduate education in science and engineering.

Mr. Chairman, in my prepared statement I outline some of the specific increases that the Department of Education and the NSF have proposed, as well as the Department of Energy, and NASA. With your permission I will not include specific comments on those agencies at this time, but would be prepared to discuss any that you might have later on.

### OSTP ACTIONS

You in your letter of invitation, Mr. Chairman, stated the subcommittee's interest, and I quote, "In learning what specific actions the OSTP has or plans to undertake regarding this concern over education and training." I am pleased to respond outlining the steps that have been undertaken to implement Dr. Bromley's pledge that, "Education and training are clearly going to be major and ongoing concerns of OSTP."

Last October 27, during my own confirmation hearings before the Senate Commerce, Science and Transportation Committee, I noted in response to a question from Senator Kerry that OSTP would in the short term pursue three actions in the science, mathematics and engineering education area. First, I noted that OSTP would respond to the request by the Senate Appropriations Committee to look into the coordination of science and mathematics education programs of the Department of Education and the National Science Foundation. Since then, OSTP has worked closely with those two agencies to improve this coordination. OSTP's report on NSF, Department of Education coordination, due March 1 of this year, was submitted to Congress on time.

In that report we noted that the Secretary of Education, Lauro Cavazos, and the Director of the National Science Foundation,

Erich Bloch, have established formal mechanisms for coordination of science and mathematics education programs between the two agencies.

The Director of NSF appointed his senior science advisor, Luther Williams, to chair the coordination effort for NSF. The assistant Secretary for Educational Research and Improvement, Christopher Cross, has been charged with heading the coordination effort in that department. Coordination at all appropriate levels between Education and NSF is the continuing responsibility of these high level officials.

Initial results of these coordination efforts have been excellent. For example, Education and NSF have initiated joint dissemination efforts whereby Education clearinghouses, regional laboratories and the National Diffusion Network will be used to provide States and localities with timely knowledge about exemplary materials and practices. In addition, Education and NSF are discussing a special upward bound initiative to provide minority high school students with opportunities similar to those provided by the NSF regional career access centers.

Second, Dr. Bromley has revitalized and reorganized the Federal Coordinating Council for Science, Engineering and Technology, known as FCCSET. FCCSET, which is comprised primarily of cabinet secretaries and heads of independent agencies, is charged with reviewing and coordinating science, engineering and technology activities that affect more than one Federal agency.

FCCSET has established seven umbrella committees in the areas of major concern, including education and human resources. Our intention is to cover the broad range of issues in science and technology that need presidential attention. In turn, FCCSET will provide input to the other White House councils, such as the Domestic Policy Council and the Economic Policy Council, on major policy issues that contain substantial elements of science and technology.

In my confirmation hearing I noted that a new committee would be established within the FCCSET structure to address problems of the nation in science and mathematics education. The new FCCSET Committee on Education and Human Resources will be chaired by Secretary of Energy James Watkins with the Under Secretary of Education, Ted Sanders, and the Senior Science Advisor of NSF, Luther Williams, serving as Vice Chairs.

The Department of Defense is also highly supportive of science and mathematics education and will be an important participant in the FCCSET committee, as will several other agencies. Other mechanisms for coordinating education and science issues include the Domestic Policy Council's education working group chaired by Secretary Cavazos and the science and technology working group of both the Economic Policy Council and the Domestic Policy Council, chaired by Allan Bromley.

Third, I reported in my confirmation hearings that Dr. Bromley had announced his intention to appoint a panel of the President's Council of Advisors on Science and Technology, known as PCAST, to study and report on science and mathematics education. The purpose of PCAST and its ad hoc panels of private sector executives, researchers and academics is to advise the President on matters involving science and technology.

At their last meeting on April 25 of this year, the PCAST discussed the issue of science and mathematics education in some detail. PCAST members Peter Likins, President of Lehigh University, and Charles Drake, a professor at Dartmouth College, are taking the lead in defining the specifics of the PCAST panel's activities in science and mathematics education.

### INTERAGENCY COORDINATION

OSTP is committed to developing and maintaining a well coordinated interagency Federal program in support of science and mathematics education. The department and agency programs described above represent collectively the administration's initial efforts to achieve the national goals developed by the President and the governors. The effects of these programs will be limited, however, unless they are closely coordinated and work in concert with reforms in the states, local school districts and schools, colleges and universities.

We plan to achieve this coordination through the new FCCSET committee. The committee's work will promote more efficient use of the expertise that exists in the agencies, avoid needless duplication, identify areas of new program opportunities and make more efficient use of limited Federal resources.

The objective of the new FCCSET committee is to develop a truly integrated interagency effort in strengthening science, mathematics, engineering and technology education at all levels and in developing and maintaining a technologically and scientifically-literate work force to keep the nation competitive in global markets.

The members of the FCCSET committee will include senior policy level officials from all federal agencies with significant responsibilities in the area of science, mathematics, engineering and technological education, including those with jurisdiction over education of scientists, mathematicians and engineers, as well as those with responsibilities for science literacy for the general public. The committee will also include those agencies that are major users of scientific and engineering personnel.

The FCCSET committee will benefit from the work of the PCAST panel on education and human resources. The President's Science Advisor, as chairman of both PCAST and FCCSET, will ensure that the FCCSET committee receives the advice and recommendations of experts outside of government. Because education and human resources are issues that necessitate both public and private sector action, and cut across federal, state and local boundaries, the issues will be most effectively addressed by the FCCSET when it has access to the best private sector advice available.

In summary, Mr. Chairman, this administration shares your concerns about the future of the science and technology work force. A concerted effort is needed to improve science, mathematics and engineering education in this country. The national educational goals, developed by the President and the governors, provide guidance and a framework for action.

The President's fiscal year 1991 budget, alluded to above, demonstrates the commitment of the Administration to a strong science, mathematics and engineering education effort. The President has

proposed important programmatic initiatives and legislative and budget priorities for consideration of the Congress.

The President is also working to forge strong cooperative relationships among Federal agencies, principally through the FCCSET Committee on Education and Human Resources. In addition, the PCAST will bring distinguished experts from outside government together to recommend actions that should be taken. Together, the efforts of FCCSET and PCAST give me confidence that the kind of tangible results that we all seek will in fact be produced.

In closing, I wish to thank you for this opportunity to present our views on the critically important subject of science, mathematics and engineering education in the United States. I shall, of course, be happy to respond to any questions.

[The prepared statement of Dr. Ratchford follows:]

29-575 0 - 91 - 18

**STATEMENT**

**BY**

**J. THOMAS RATCHFORD**

**ASSOCIATE DIRECTOR FOR POLICY AND INTERNATIONAL AFFAIRS**

**OFFICE OF SCIENCE AND TECHNOLOGY POLICY**

**EXECUTIVE OFFICE OF THE PRESIDENT**

Mr. Bingaman, Members of the Subcommittee:

It is a distinct honor and pleasure to testify before you this afternoon on the matter of science and engineering education in the United States.

The Administration shares with this subcommittee its concerns over the decline in the science and technology workforce over a period of many years. The problem is both qualitative and quantitative. We are already facing a shortage of well-trained, top notch scientists and engineers within the Federal government, in our universities, and increasingly within the private sector. Furthermore, an adequate supply of excellent future scientists is in jeopardy, because the numbers of young people of college age is declining and the percentage of those students interested in science and engineering is likewise dropping.

## PRESIDENT'S ACTIONS

The President and this Administration are fully aware of the problems we face, and we have made significant strides in addressing science and mathematics needs through the national

education summit, the agreement on national education goals, and through the FY 1991 budget for science and mathematics education.

Developing National Education Goals

Last fall the President convened the Nation's Governors for the National Education Summit in Charlottesville, Virginia, to address critical problems and issues relating to education. This had not happened since President Roosevelt convened a summit of the governors to deal with the banking crisis during the depression. Following the Charlottesville Summit, the President and Governors have agreed upon National Education Goals and objectives to be reached by the turn of the century. Science and mathematics are central to those National Goals, which include the following:

> By the year 2000, American students will leave grades four, eight and twelve having demonstrated competency in challenging subject matter including English, mathematics, science, history, and geography; and every school in America will ensure that all students learn to use their minds well, so they may be prepared for responsible citizenship, further learning, and productive employment in our modern economy.
>
> By the year 2000, U.S. students will be first in the world in science and mathematics achievement.

These goals form a framework for national policy and strategic investments in science, mathematics, technology, and engineering education.

FY 1991 Budget for Science and Mathematics Education

Through the FY 1991 budget the President has placed high priority on programs and funding for science and mathematics education. The 1991 budget proposes over $1 billion in direct spending in five agencies for science, mathematics, and engineering education, an increase of 26 percent above 1990. These programs are designed to advance general scientific literacy and mathematical numeracy and to prepare the next generation of scientists, engineers, and technicians.

The Department of Education (ED) and the National Science Foundation (NSF) have substantial programmatic responsibility for science, mathematics, and engineering education, with critical supplementary roles played by the Department of Energy (DOE), National Aeronautics and Space Administration (NASA), and the National Institutes of Health (NIH). Other agencies, in particular the Department of Defense, play important supporting roles as well.

The Department of Education FY 1991 budget calls for substantial increases in funding for programs directly focused on science and mathematics education. The 1991 budget proposes $230 million, an increase of $94 million or 70 percent over 1990, for the Dwight D. Eisenhower Mathematics and Science program. These funds will be provided to States to develop and implement improved programs for teaching mathematics and science. In addition, there is a $500 million increase called for in Chapter 1 funding for the disadvantaged -- a portion of which will be used by local school districts for remedial mathematics. ED also supports R&D on science and mathematics education in ten of its research centers, three of which are specifically focused on science,

mathematics, and technology. And the priorities for ED's Graduate Assistance in Areas of National Need are all in the physical sciences, mathematics, and engineering. The National Science Foundation's FY 1991 budget provides $463 million for a range of activities designed to improve science, mathematics, and engineering education and develop human resources. This is an increase of $106 million or 30 percent over 1990 for education and human resources. This increase includes $47 million over the 1990 budget for the Science and Engineering Education Directorate. Programs that support education for underrepresented groups -- minorities, women, and the disabled -- have an increase of 50 percent in the proposed budget. And the budget contains a 50 percent increase in support of undergraduate science, mathematics, and engineering education programs across the Foundation.

Most of the Science and Engineering Education Directorate funds are devoted to elementary and secondary teacher preparation and enhancement, instructional materials development, the application of advanced educational technologies, and informal science and mathematics education. In addition, the NSF has initiated support for comprehensive reforms which encompass all levels of education and each of the major education components -- curriculum content, teaching and teachers, testing and instructional materials, and organizational arrangements. The Foundation has recently announced a major statewide, systemic reform initiative in science, mathematics, and engineering education to stimulate States to undertake comprehensive, integrated improvements in their systems of teaching and learning these critical subjects.

NSF continues to increase the number of Comprehensive

Regional Centers for Minorities. These Centers focus on learning from grade school through graduate school. And the NSF is expanding the scientist/educator/publisher "triad" projects to improve curriculum materials from elementary science to middle school mathematics. These partnerships are specifically designed to make sure that materials are tested in realistic situations and that their potential for adoption is increased.

NSF's substantial increase in support of undergraduate and graduate programs includes doubling resources for undergraduate course and curriculum reform; a large increase in instructional laboratory and instrumentation projects; significant investment in Engineering Education Coalitions; and an additional 100 graduate fellowships. The NSF also funds postgraduate, graduate, and undergraduate research opportunities through cross-discipline research programs, such as the Global Change Research Education and Training Program and Research Training Group awards. A substantial cadre of undergraduate and graduate students are also supported via NSF research grants.

The Department of Energy's 1991 budget contains a 19 percent increase in education funds -- an increase to $30 million. This includes initiatives for precollege as well as undergraduate and graduate education. The DOE supports over 6,000 undergraduates, graduate students, and college and university faculty through research fellowships.

The 1991 budget provides $51 million, a 21 percent increase over 1990, for the education activities of the National Aeronautics and Space Administration. At the precollege level, NASA education resources will be invested in informal science education and

presentations to schools, and teacher workshops and internships at NASA research centers. NASA also supports undergraduate and graduate student research.

The NIH provides nearly $300 million in training grants for almost 12,000 graduate trainees in research laboratories. That is over and above the thousands of graduate and post-graduate research opportunities offered students through NIH research grants.

## OSTP ACTIONS

Mr. Chairman, in your letter of invitation you stated the subcommittee's interest "in learning what specific actions the OSTP has, or plans to, undertake regarding this concern" over education and training. I am pleased to respond, outlining the steps that have been undertaken to implement Dr. Bromley's pledge that "Education and training are clearly going to be major and ongoing concerns of OSTP."

Last October 27, during my confirmation hearings before the Senate Commerce, Science and Transportation Committee, I noted in response to a question from Senator Kerry that OSTP would, in the short term, pursue three actions in the science, mathematics, and engineering education area.

First, I noted that OSTP would respond to the request by the Senate Appropriations Committee to look into the coordination of science and mathematics education programs of ED and NSF. OSTP has worked closely with ED and NSF to improve coordination of science, mathematics, and engineering education programs between those two agencies. OSTP's report on ED-NSF

coordination, due March 1, 1990, was submitted to Congress on that date.

In that report we noted that the Secretary of Education, Lauro Cavazos, and the Director of the NSF, Erich Bloch, have established formal mechanisms for coordination of science and mathematics education programs between the two agencies. The Director of NSF appointed his Senior Science Advisor, Luther Williams, to chair the coordination effort for NSF. The Assistant Secretary for Educational Research and Improvement, Christopher Cross, has been charged with heading the coordination effort for ED. Coordination at all appropriate levels between ED and NSF is the continuing responsibility of these high-level officials.

Initial results of these coordination efforts have been excellent. For example, ED and NSF have initiated joint dissemination efforts whereby ED clearinghouses, regional laboratories, and the National Diffusion Network will be used to provide States and localities with timely knowledge about exemplary materials and practices. In addition, ED and NSF are discussing a special Upward Bound initiative to provide minority high school students with opportunities similar to those provided by the NSF Regional Career Access Centers.

Second, Dr. Bromley has revitalized and reorganized the Federal Coordinating Council for Science, Engineering and Technology (FCCSET). FCCSET, which is comprised primarily of Cabinet secretaries and heads of independent agencies, is charged with reviewing and coordinating science, engineering, and technology activities that affect more than one Federal agency.

FCCSET has established seven umbrella committees in the areas of earth and environmental sciences; education and human resources; food, agriculture, and forest research; international science, engineering, and technology; life sciences and health; physical, mathematical, and engineering sciences; and technology and industry. Our intention is to cover the broad range of issues in science and technology that need Presidential attention. In turn, FCCSET will provide input into the other White House Councils, such as the Domestic Policy Council (DPC) and the Economic Policy Council (EPC), on major policy issues that contain substantial elements of science and technology.

In my confirmation hearing I noted that a new committee would be established within the FCCSET structure to address problems of the nation in science and mathematics education. The new FCCSET Committee on Education and Human Resources has been established. It will be chaired by Secretary of Energy James Watkins, with the Under Secretary of Education, Ted Sanders, and the Senior Science Advisor of NSF, Luther Williams, serving as vice chairs. The Department of Defense is also highly supportive of science and mathematics education, and will be an important participant in the FCCSET Committee, as will several other agencies. Other mechanisms for coordinating education and science issues include the DPC Education Working Group chaired by Secretary Lauro Cavazos and the EPC/DPC Science and Technology Working Group chaired by Allan Bromley.

Third, I reported in my confirmation hearings that Dr. Bromley had announced his intention to appoint a panel of the President's Council of Advisors on Science and Technology (PCAST) to study

and report on science and mathematics education. The purpose of PCAST and its ad hoc panels of private sector executives, researchers, and academics, is to advise the President on matters involving science and technology. At their last meeting on April 25, 1990, the PCAST discussed the issue of science and mathematics education in some detail. PCAST members Peter Likins, President of Lehigh University, and Charles Drake, a professor at Dartmouth College, are taking the lead in defining the specifics of the PCAST panel's activities in science and mathematics education.

## INTERAGENCY COORDINATION

OSTP is committed to developing and maintaining a well-coordinated interagency Federal program in support of science and mathematics education. The department and agency programs described above represent, collectively, the Administration's initial efforts to achieve the National Goals developed by the President and the Governors. The effects of these programs will be limited, however, unless they are closely coordinated, and work in concert with reforms in the States, local school districts and schools, colleges, and universities.

We plan to achieve this coordination through the new FCCSET Committee on Education and Human Resources, which will coordinate, on a continuing basis, activities of the Federal agencies related to science, mathematics, engineering, and technological education, training, and human resource development. The Committee's work will promote more efficient use of the expertise that exists in the agencies, avoid needless duplication, identify areas

of new program opportunities, and make more efficient use of limited Federal resources. The objective of this new FCCSET Committee is to develop a truly integrated interagency effort in:

- o strengthening science, mathematics, engineering, and technology education at all levels; and
- o developing and maintaining a technologically and scientifically literate workforce to keep the nation competitive in global markets.

The members of the FCCSET Committee on Education and Human Resources will include senior policy-level officials from all Federal agencies with significant responsibilities in the area of science, mathematics, engineering, and technological education, including those with jurisdiction over education of scientists, mathematicians, and engineers, as well as those with responsibilities for science literacy for the general public. The Committee will also include those agencies that are major users of scientific and engineering personnel.

The FCCSET Committee will benefit from the work of the PCAST panel on education and human resources. The President's Science Advisor, as Chairman of both PCAST and FCCSET, will ensure that the FCCSET Committee receives the advice and recommendations of experts outside of government. Because education and human resources are issues that necessitate both public and private sector action, and cut across Federal, State, and local boundaries, the issues will be most effectively addressed by

the FCCSET when it has access to the best private sector advice available.

## SUMMARY

This Administration shares your concerns about the future of the science and technology workforce. A concerted effort is needed to improve science, mathematics, and engineering education in this country. The National Education Goals, developed by the President and the Governors, provide guidance and a framework for action.

The President's FY 1991 budget, described above, demonstrates the commitment of the Administration to a strong science, mathematics, and engineering education effort. The President has proposed important programmatic initiatives and legislative and budget priorities for consideration of the Congress.

The President is also working to forge strong, cooperative relationships among Federal agencies, principally through the FCCSET Committee on Education and Human Resources. In addition, the PCAST will bring distinguished experts from outside government together to recommend actions that should be taken. Together, the efforts of FCCSET and PCAST give me confidence that the kind of tangible results that we all seek will be produced.

In closing, I wish to thank you for this opportunity to present our views on the critically important subject of science, mathematics, and engineering education in the United States.

Senator BINGAMAN. Thank you very much. I appreciate that.

Dr. Decker, why don't you go ahead and give us your views before I ask any questions.

## STATEMENT OF JAMES F. DECKER, ACTING DIRECTOR, OFFICE OF ENERGY RESEARCH, DEPARTMENT OF ENERGY

Dr. DECKER. Thank you, Mr. Chairman. It is a pleasure for me to appear before you today to discuss the Department of Energy's activities to promote science, mathematics and engineering education in the United States.

In addition to the national security responsibilities with which this subcommittee is very familiar, the Department is charged with developing energy technologies to help provide the Nation with a mixed and balanced supply of energy. Also the Department of Energy has a mission to support basic research and to broaden the scientific knowledge base of the Nation.

To support our defense, energy and basic research missions, the Department will invest $6.9 billion in research and development this year. For this large activity, we require a significant number of scientists and engineers to fulfill this mission. Over 30,000 of the finest scientists and engineers work in our Government-owned, contractor-operated laboratory system, which employs over 160,000 people in the total plant and laboratory complex.

Our world-class laboratory complex includes nine major multiprogram national laboratories and 30 single-purpose laboratories which carry out research in almost every scientific discipline.

The Department must be concerned about the projected shortfalls of mathematicians, scientists and engineers, since that could adversely affect the Department's ability to meet its missions in the future.

Even more important, it is a national problem that will affect the technological, and thus, the economic future of our country. Therefore, recognizing its own needs and those of the Nation as a whole, the Department has given science education a high priority and has been increasing its science education activities.

The Department has legislative authority to carry out education-related activities. The Energy Research and Development Administration Act of 1974 requires DOE to support education and training activities to help ensure that an adequate supply of human resources is available to carry out energy R&D programs.

The DOE Reorganization Act of 1977 specifically directs that my office, the Office of Energy Research, be the principal advisor to the Secretary on education and training activities that are needed to support DOE's basic and applied research activities.

Like other mission agencies of the Federal Government, the DOE science education programs traditionally have focused at the graduate and post-doctoral levels. However, we have recognized that is not enough. Nearly every study of our Nation's science education problem has emphasized the need to attract students to science and retain their interest from kindergarten through college, and on into graduate school.

It is also recognized that we must upgrade science teaching skills. Today the Department's programs include kindergarten

through 12 and undergraduate programs, as well as graduate and post-doctoral support. It also includes support for additional training and exposure to frontier research for science teachers.

I will describe the Department's support of science education starting at the graduate level. The majority of the Department's support for graduate study is tied to the Office of Energy Research's support of research at universities and colleges across the country.

The Department's research grants totalled about $480 million in 1990, which will support about 4,500 graduate students.

In addition, and unlike most agencies, the Department, and specifically my office, provides substantial support to science education through its scientific user facilities, such as accelerators, reactors, synchrotron light sources, and so forth, located at major DOE laboratories. These facilities are made available to university scientists free of charge to carry out research in physics, chemistry, biology, and other fields. Many graduate students do research at these facilities that lead to advanced degrees.

Like other agencies, DOE programs, such as the laboratory cooperative program, permit university professors and graduate students to participate in research at the laboratories during the summer. At DOE, however, about 1,000 undergraduates also do hands-on scientific research at the Department's laboratories.

This program is especially attractive to small colleges and universities across the country because the undergraduate students are working on state-of-the-art and often unique scientific equipment in their fields. At DOE, under the nationally competitive Science and Engineering Research Semester Program, undergraduate students can spend a full semester participating in ongoing research at a laboratory science education center.

Most of these DOE activities are well known to the scientific community. Substantial numbers of university faculty, graduate students and undergraduates work with or are closely associated with work at the DOE laboratories. This link between the laboratories and university researchers and graduate and undergraduate students is one of the most important contributions the DOE makes to science education.

In view of the growing problems anticipated, to be able to continue to attract the quality and quantity of scientists and engineers needed to meet the Nation's needs, DOE expanded its science education programs at the laboratories to include a few new pre-college programs with a focus on high school students.

In fact, the Department expanded the laboratory link further down the education pipeline to include not only university faculty graduate and undergraduate students but also pre-college students and teachers as well. The major DOE contribution in the pre-college area is similar to our traditional approach, in that it focuses on utilizing the unique resources of the national laboratories to provide young students and their teachers with an exposure to the excitement of science through hands-on research experience working with professional scientists in outstanding facilities.

In these programs and in those linking historically black colleges and universities with national laboratories through formal agreements, the Department has consistently aimed to enhance the op-

portunities for minorities and women interested in science and engineering.

At the outset of Admiral Watkins' tenure as Secretary of Energy, he articulated the serious problems facing the Nation over the next 10 years as a result of the growing crisis in the quality of science education, and a declining number of young Americans, including women and minorities, interested in pursuing careers in science and engineering.

The Secretary called upon the major DOE laboratories to develop additional initiatives, including ways that the resources of the national laboratories could be more fully and effectively utilized in supporting science education, particularly at the pre-college level. He also called upon laboratory scientists, mathematicians, engineers and technicians, to increase their already exemplary volunteer activities to promote science education and public scientific literacy.

In October of last year, Admiral Watkins also held a pre-college Math/Science Education Action Conference at the Lawrence Hall of Science with Dr. Glenn Seaborg, and nearly 200 scientists, educators and Federal and State agency representatives and business executives participated.

At that meeting, they developed an ambitious action plan for revitalizing mathematics and science education. As a result, in addition to expanding the base pre-college programs I mentioned, the Secretary has supported several new efforts at the Department's laboratories for younger students and their teachers.

For example, the new laboratory pre-college activities in fiscal year 1991 will include the initiation of inner city rural partnerships designed to revitalize math and science education in targeted school districts. These efforts will focus on middle school and high school, where the dropout rates are highest.

Another initiative will be the establishment of a pre-college mathematics education program at the Department's laboratories focused on high school teachers. There will also be increased pre-college science teacher research appointments and minority high school student appointments at the laboratories to encourage more students to stay in the math/science pipeline. Three collaborative initiatives involving the laboratories have already been announced that respond to this new emphasis on science education. The Chicago Science Explorers program is a collaboration among Argonne National Laboratory, Fermi National Accelerator Laboratory, the Chicago Public Schools, a Chicago television station and a group of Chicago institutions involved in science education. The program is aimed at stimulating a high level of interest in science and math in 10,000 Chicago students.

The second collaborative initiative is a cooperative program in math and science education between DOE facilities in Oak Ridge, Tennessee and the University of Tennessee. It will provide opportunities to college students who want to teach math or science, as well as to laboratory scientists and engineers or retirees who want to teach through alternative certification.

A third initiative begins this spring, and involves the Pacific Northwest Laboratory in a collaborative science education program impacting the Hispanic and Native American population with an-

other initiative expected in New Mexico using Los Alamos and Sandia National Laboratories.

Seven of the Department's laboratories have evolved into science education centers and carry out several Nation-wide programs for DOE, including laboratory cooperative science and education research semesters, high school honors, and research apprenticeships, and teachers' research associates programs.

The Department is designing into the Superconducting Super Collider Laboratory in Texas a National Center of Excellence in Science, Engineering and Mathematics Education. The SSC will be a national symbol of pride in excellence in U.S. science and technology, and can also serve as a real-time window into science, engineering and math for school children and their teachers, as well as college faculty and their students.

The Department's major approach is to positively impact the educational process in order to encourage students and teachers to seek science and engineering careers and to remain committed to study in these areas. The process is to undertake positive, focused, timely and continuing interventions through close personal contact with world-class researchers involving hands-on research experience in outstanding laboratories.

The range of activities at the laboratories today includes all stages in the educational pipeline from Outreach to early school students, to stimulate and nurture interest in science, to special programs at the middle school and high school levels to give students and their teachers a taste of live science, and to intensive research experiences for university students and faculty.

There are few places in this country that can equal the diversity of science education opportunities and resources available in major DOE multi-program national laboratories. Science, disciplinary and multi-disciplinary research, individual investigator and team research, are coupled with world-class scientific facilities, equipment and technical support resources.

This represents the Department's unique contribution to science education, and even though thousands of scientists are currently involved in education-related activities, the potential of these laboratories to provide major assistance to pre-college and university science education has only been partially realized. These efforts will continue to be expanded as part of the Department's commitment to science education.

Mr. Chairman, that concludes my summary and I will be pleased to answer any questions you may have.

[The prepared statement of Dr. Decker follows:]

Statement of James F. Decker
Acting Director
Office of Energy Research
Department of Energy

Mr. Chairman and Members of the Subcommittee:

It is a pleasure for me to appear before you today to discuss the Department of Energy's activities to promote science, mathematics and engineering education in the United States.

## UNIVERSITY AND SCIENCE EDUCATION

There is a growing consensus that one of the most serious problems facing the Nation over the next ten years is the declining number of young Americans, including women and minorities, interested in pursuing careers in science and engineering. Those who are interested often receive inadequate preparation for such careers. This crisis in science education has serious implications for the Nation's continued international economic and technological competitiveness. It also has implications for the Department's ability to carry out its science, energy, and defense R&D missions.

The Department is both a user and a patron of a large fraction of the Nation's scientists and engineers. To meet the challenges facing the Department today and in the future, we have to depend on the scientific creativity and technical skills of our workforce. DOE is uniquely positioned to provide major assistance to the national effort to strengthen science and engineering education.

The historic focus of DOE support for science education has traditionally been at the graduate and postdoctoral levels. The principal means by which this is accomplished is through the support of university research by DOE which totals approximately $450 million in FY 1990. This support also funds the participation of 3,500 - 4,000 graduate students. In recent years, expanded

support has been provided for precollege and undergraduate-level science education programs at the major DOE laboratories.

Several of our laboratories have been designated as Science Education Centers and are carrying out comprehensive science education programs. Our efforts complement those of the National Science Foundation, the Department of Education, and other Federal agencies, state and local governments, and the education community by providing students and their teachers with "hands on" experiences in ongoing, cutting-edge scientific and technical research.

CURRENT SCIENCE EDUCATION ACTIVITIES

The Department of Energy's science education programs focus on:

- Providing incentives and opportunities for underrepresented minorities including women, to pursue careers in science and technology;
- Providing opportunities for students and their teachers to improve their scientific and technical skills and knowledge;
- Utilizing the unique resources of the Department's national laboratories, primarily by providing hands-on research experience, to support and assist in the education of young people for careers in science, mathematics and technology.

Seven national laboratories are currently designated as Laboratory Science Education Centers (Argonne, Brookhaven, Fermi, Lawrence Berkeley, Los Alamos, Oak Ridge and Pacific Northwest). Each center is responsible for the planning and administration of a range of national, regional and state and local science education programs. These centers along with a number of other DOE facilities conduct a range of precollege and university science education programs which vary by laboratory. Descriptions of the programs underway at these Laboratory Science Education Centers are attached to my testimony.

I would now like to describe in more detail the science education programs supported by the Department at the national laboratories and other DOE

research facilities.

- o High School Science Student Honors Research Program

  This program provides a two-week summer hands-on research opportunity for the very best high school science and mathematics students from each state, Puerto Rico, the District of Columbia and some foreign countries. Students are selected by the Governors in response to an invitation from the Secretary to participate in this national, competitive program. Three hundred and seventy four students are currently supported. Approximately 30% are women or minorities. Seven laboratories participate: Argonne National Laboratory (material science including superconductivity), Brookhaven National Laboratory (physics, material science and biology), Fermi National Accelerator Laboratory (high energy particle physics), Lawrence Berkeley Laboratory (life sciences), Lawrence Livermore National Laboratory (computational sciences using the CRAY II supercomputer), Oak Ridge National Laboratory (environmental science), and Pacific Northwest Laboratory (desert and marine ecosystems).

- o High School Teacher Research Associates (TRAC) Program

  Science and mathematics teachers from each state are nominated by the Governors to participate in a special eight-week research program at selected laboratories. About 135-150 teachers (roughly 50% women and <10% minorities) participate in this national, competitive program. They serve as members of research teams and their experience may include preparation of supplemental materials and experiments for use back in the classroom. This program increases teacher awareness and understanding of current science and technology and promotes transfer of new knowledge to the classroom.

- o High School Student Research Apprenticeship Program

  This program is designed to motivate freshmen and sophomore high school minority and female students to pursue science careers. About 130 students (>90% minorities and women) are involved in a six to

eight-week summer experience at a laboratory which includes laboratory research, lectures, seminars and field activities. Four laboratories (Argonne, Brookhaven, Fermi, and Pacific Northwest) will be involved in FY 1990.

o International Science and Engineering Fair Awards

The ten best student-designed energy research projects at the International Science and Engineering Fair are selected. These students and their teachers spend one week at a DOE laboratory during the summer. The Idaho National Engineering Laboratory will host the 1990 student winners and their teachers.

o Partnership Schools Program

DOE operations offices and laboratories have developed partnerships with local elementary/secondary schools as part of the President's National Partnerships in Education Program. Examples are: DOE Headquarters and Woodrow Wilson Senior High School in D.C., Chicago Operations Office and Bolingbrook High School, Nevada Operations Office and Mountain View Elementary School, and Oak Ridge National Laboratory and the science departments at six local high schools. Adopted schools receive DOE assistance in such areas as "loan" of equipment and materials, career counselling and tutoring, field trips to scientific facilities, assistance in science fair projects including judging, etc.

o Undergraduate Student Summer Research

Approximately 1,000 undergraduate junior and senior science and engineering students (roughly 35% women and 15% minorities) are selected competitively for summer research opportunities at over twenty DOE laboratories. Students from non-PhD granting institutions (or institutions with limited PhD programs) are particularly encouraged to apply. Student assignments are carefully selected and monitored to assure they are meaningful and at an appropriate

professional level.

- Science and Engineering Research Semester (SERS)

  SERS is a national, competitive program which provides unique research opportunities for high ability (at least a 3.0 average on a 4.0 scale) college juniors and seniors. Students from non-PhD granting institutions (or institutions with limited PhD programs) are particularly encouraged to apply. About 300 students (roughly 35% women and 20% minorities) participate in ongoing research at the cutting edge of science, receive training and experience in the operation of sophisticated, state-of-the-art equipment and instruments, and receive instructions in their chosen fields of study at one of the science education centers.

- Graduate Student Research and Thesis Support

  This program provides summer support for first or second year graduate student research at a lab, and support for use of DOE facilities and instruments by graduate students to conduct short-term portions of their research (a few days to several weeks) at a DOE facility as well as up to one year appointments (renewable to a maximum of three years for the PhD) for full-time graduate students enrolled at a DOE facility. Approximately 250 students (<25% women and minorities) participate each year.

- Faculty Summer and Sabbatical Research

  This program supports about 300 summer or sabbatical year faculty research appointments (about 20% minority and 6% women) working with a laboratory staff member on a problem of mutual interest. Program emphasis is on young investigators, and faculty from smaller colleges.

- Faculty/Student Research Teams

  About 30 teams consisting of one faculty member and usually one to three undergraduate or graduate students, participate in ongoing

research at a lab in collaboration with senior staff at the DOE facility. Teams from non-PhD granting institutions (or institutions with limited PhD programs) are particularly encouraged to apply. This effort provides a unique mechanism for transferring the results of federally funded research and development into training and learning opportunities through research participation and enhances energy-related research capabilities on the various campuses.

o Workshops and Institutes on Energy-Related Research

Various DOE facilities offer a variety of other opportunities for faculty members and teachers. Two-to-three day workshops on special topics of interest tied closely to laboratory research programs are held which fill the gap between treatment given in meetings and the longer exposure attained as a research participant. One-to-four week institutes are sometimes offered which are instructional sessions on subject matter relating to various energy technologies and serve as an aid in teaching and student guidance. In addition, conferences on a broad range of topics associated with energy and its developing technology are sometimes presented in conjunction with universities or professional organizations. Approximately 500 faculty members are involved in these programs.

o Outreach Activities

Each laboratory conducts a number of both formal and informal programs in addition to those noted above. Components of these programs include research participation; workshops and institutes; supplemental materials; in-house tours, lectures, and demonstrations; direct classroom instruction; community outreach; and a variety of special events. Examples include a Saturday Morning Physics lecture series for high school students, a Sharing Science with Schools program for junior and senior high schools, and a workshop for junior and middle high school teachers which introduces concepts in particle physics for use in the classroom. In addition, there are a number of

ad hoc support activities and membership in professional and community organizations. The program goals are to enhance student interest in science careers and scientific literacy in general. The goals for precollege teachers include enhancing content knowledge, improvement of instructional strategies, increased career awareness, understanding of science-technology-society relationships, and enhanced supplemental materials.

- o Historically Black Colleges and Universities (HBCU's)
  DOE national laboratories have developed both formal and informal relationships with HBCU's and other traditionally minority universities. The goal of these programs is to strengthen the research and education capabilities of the minority institutions through support of such activities as faculty and student research internships at the labs; assistance in development of new research; research equipment loans; computer time; collaborative research with lab scientists; and assistance in development of new academic courses. Two such collaborations are between Lawrence Berkeley Laboratory/Jackson State University/Ana G. Mendez Education Foundation of Puerto Rico; and the Science and Technology Alliance with Los Alamos National Laboratory/New Mexico Highlands University, Oak Ridge National Laboratory/North Carolina A&T University, and Sandia National Laboratories/Turabo University of Puerto Rico.

- o Graduate Research and Postdoctoral Fellowships
  DOE also funds competitive fellowships in several research areas of importance to the Department including magnetic fusion, nuclear engineering and health physics, environmental remediation and waste management.

In addition to the above laboratory based programs, DOE supports a national pre-college program, the PreFreshman Engineering Program (PREP). PREP provides support for colleges and universities which grant engineering

degrees, or have dual-degree pre-engineering programs or formal agreements with engineering degree-granting institutions, to conduct summer institutes for women and minority junior or senior high school students (7th - 10th grades). This program helps alleviate manpower shortages in engineering by preparing and guiding students in the selection of college-preparatory courses in science and mathematics; and by encouraging them to consider careers in science-related fields. PREP provides a number of pre-engineering enrichment experiences including laboratory work, field trips, tutoring and counselling. Institutions are encouraged to cost share the projects with university and/or industrial support. This program reaches 1,500 - 2,000 students per year.

Admiral Watkins has made support for science education a personal and Departmental goal. He was an active participant in the President's Charlottesville Summit Conference. Last October, shortly after the Conference, the Secretary and Nobel Laureate Glenn Seaborg co-hosted a Math/Science Education Action Conference in Berkeley, California. Over 200 senior representatives from Federal agencies, Congress, education associations, States, industry, and the National Laboratories met in working groups to formulate the outline of an action plan to improve science education dramatically by the year 2007, the fiftieth anniversary of Sputnik.

The FY 1991 budget of $29.7 million for University and Science Education reflects, in part, the Secretary's and the Department's commitment. The Department will continue the existing base programs, including undergraduate student summer and semester research programs as well as faculty and graduate student research activities. The Department will also include new activities responsive to the Secretary's Math/Science Education Action Conference and to recent reports including the Energy Research Advisory Board's report on the Department's potential role in science education; the Interagency Task Force on Women, Minorities and the Handicapped in Science and Technology report, "Changing America: The New Face of Science and Engineering;" and the National Research Council report, "Everybody Counts."

New Initiatives in FY 1991

Among the new initiatives proposed for FY 1991 are DOE laboratory-inner city/rural partnerships designed to revitalize math and science education in targeted school districts. Another initiative will be the establishment of a precollege mathematics science education program at the DOE laboratories. There will also be: a travelling museum-based science education program consisting of exhibits on major energy-related scientific programs; increased precollege science teacher research appointments and minority high school student appointments to encourage more students to stay in the math/science pipeline; and emphasis on reaching students at a younger age, especially women and minorities, through an expanded Prefreshman Engineering Program (to be renamed the Prefreshman Enrichment Program encompassing math, science, and engineering.)

Two collaborative initiatives have already been announced that respond to this new emphasis on science education. The Chicago "Science Explorers Program" is a collaboration among ANL, Fermilab, the Chicago Public Schools, and a group of Chicago institutions involved in science education. The program is aimed at stimulating a high level of interest in science and math in 10,000 Chicago students. Another initiative is a cooperative program in math and science education between DOE facilities in Oak Ridge, Tennessee and the University of Tennessee. It will provide opportunities to college students who want to teach math or science, as well as to scientists and engineers or retirees who want to teach. A third initiative will begin this Spring and will involve the Pacific Northwest Laboratory in a collaborative science education program impacting the Hispanic, Black and Native American populations, in the Yakima Valley, Seattle and Portland areas, with another initiative expected in New Mexico using Sandia and Los Alamos National Laboratories in partnership with middle schools throughout the State and Native American schoos in Northern New Mexico and Arizona.

That concludes my statement. I would be happy to answer any questions.

[More detailed descriptions of the Department's science education activities and programs submitted by Dr. Decker will be retained in committee files.]

Senator BINGAMAN. Thank you very much. Let me first ask Dr. Ratchford a few questions. Your testimony is that so far the 1991 budget submitted by the administration contained in it an increase of 26 percent for science, math and engineering education in five agencies, and then you specified what those were. It was Department of Energy, NASA, NIH, Department of Education and NSF.

Could you advise me as to how the Department of Defense funding in these areas fared in your current budget?

Dr. RATCHFORD. Let me say a word or two about the figures that I gave, which were derived from the President's budget document submitted to the Congress. I also added in my testimony that this particular collection of statistics misses much of what is being done in the field of mathematics, science and engineering education in the country. In particular it misses very large segments of support in a couple of categories. One of these relates to the support of graduate students and the research that these graduate students undertake at our universities. They are typically supported through a project grant mechanism and, depending on the agency, the figures for those investments are either not available or not collected.

Second, these figures do not include much of the Federal support for training of individuals. In the military it is military officers and civilian employees. In the other Federal agencies it is typically their own employees.

One of the first objectives of the new FCCSET Committee on Education in Human Resources will be to carry out a proper census of what the Federal Government is currently doing in math and science education. I had the privilege of looking over the report that the Department of Defense has just presented to your subcommittee, and it is quite clear that the very large dollar amounts which they have identified are, in fact, important elements of the overall support structure for math and science education. They do not appear in the budget for this year. My anticipation is, Mr. Chairman, that they will appear next year, and the importance of them will be apparent.

Senator BINGAMAN. I guess maybe you could help in trying to identify that. Maybe you could clarify for me one of the tables that the Department of Defense, Dr. Berlincourt, has attached to his testimony, which we are going to hear in a few minutes, which shows that the grand total for science and engineering education programs through the Department of Defense is $340 million.

Maybe this is a question for you, Dr. Decker. I am not sure. In your testimony you state that the Department of Energy is making a combined contribution of $450 million, but now you are talking about support for research in universities and not the kind of direct assistance to graduate students and undergraduate students that I talked about in here, is that right?

Dr. DECKER. That is correct.

Senator BINGAMAN. Do you have a figure that will compare? For example, the figure that they have here at the Department of Defense for graduate level in this Table Number 3 attached to Dr.

Berlincourt's testimony is $184 million. Do you have a comparable figure for the Department of Energy?

Dr. DECKER. I do not have a comparable figure for the Department of Energy. Our fiscal year 1991 budget request's $30 million for university and science education programs. But in a number of DOE programs support is provided for fellowships, traineeships and that sort of thing, and I do not have the figure to cover all of that, however, we are working on an agency-wide crosscut now.

Senator BINGAMAN. Dr. Ratchford, do you have any figures that compare this graduate level here, research assistantships, $157 million, the total at the graduate level that this Department of Defense table 3 indicates at $184 million? Do you have any comparable figure for other agencies that would compare to that?

Dr. RATCHFORD. I do not have a comprehensive set of figures, Mr. Chairman. As I indicated earlier, we hope to derive those in the next few months before the end of this calendar year. Just one figure that I could throw out, the National Institutes of Health has funding of almost $300 million identified in the table that I referred to which appears in the fiscal 1991 budget document. The bulk of those dollars are, in fact, related to graduate traineeships and are comparable to, in a sense, the fellowships and research assistantships that combined are something like the $177 million which appear in the Department of Defense table.

I think it is important to understand that we have not, on a careful and systematic basis, collected the kind of information that we are all agreed is needed and, in fact, the new FCCSET committee will be doing that as one of its first acts.

Senator BINGAMAN. Let me ask on the FCCSET committee that has been established, is this a committee that was set up for a set period of time with a particular goal in mind? Is it to issue a report? Is it to do some concrete things and then go out of existence again? Is that the idea of this or is it an ongoing activity?

Dr. RATCHFORD. All of the FCCSET committees—there are seven in number—are established for a period of two years at which time they can be reconstituted. The objective, as enunciated by Dr. Bromley on several occasions, is that we do not want to set in concrete the structure which may evolve over time in such a way that it needs to be either changed or go out of existence.

We anticipate, however, that this particular committee will in the context of the fiscal year 1992 budget cycle develop a comprehensive interagency program in mathematics and science education, one that represents a national, truly interagency effort, and that the budget associated with that effort will be included through the normal budget process in the fiscal 1992 budget.

This presently is the case in the global change research budget which the Committee on Earth Sciences, another of the FCCSET committees, provided in this fiscal year.

Senator BINGAMAN. Let me ask you as an ongoing matter how it is to be managed. I know that Senator Hatfield and Senator Glenn have a bill of which I am co-sponsoring which is to promote interagency cooperation in this area, and it calls for establishing an interagency council to be headed by the head of OSTP. Is that the oversight mechanism that the administration supports to carry this activity forward?

Dr. RATCHFORD. With some changes. The principle is the same. There is one particular change, though, that deserves a moment or two of discussion. All of the committees of the Federal Coordinating Council under Dr. Bromley's plans would be chaired by individual leaders from the agencies. They provide chairs and vice chairs, and the rationale here is that the Office of Science and Technology Policy is a very small office, and its director, associate directors and few staff are spread pretty thin and, therefore, should give their attention to policy issues and not to operational ones.

A successful committee on education and human resources, if it is, in fact, going to develop a truly interagency program, will have to do a lot of work. There will have to be a lot of meetings, and there will have to be a degree of detail dealt with that Dr. Bromley feels is not appropriate for the Office of Science and Technology Policy, given the other responsibilities that the office has, and that he has also as the assistant to the President for Science and Technology and director of the office.

Senator BINGAMAN. I guess that leaves me with still the question as to once this FCCSET committee has done its work and made its recommendation and once the Congress has—well, even before the Congress acts on it, how do we manage our science, engineering and math education in the Federal Government? Someone has got to have enough authority and enough staff to oversee this thing and make sense out of it and keep it moving ahead.

As I understand, you are saying the President's Science Advisor through the Office of Science and Technology Policy is not the person——

Dr. RATCHFORD. If you are looking for a hands-on manager, Mr. Chairman, I would say that is correct. The Office of Science and Technology Policy is not that institution. What we aim to do, however, is to develop an integrated program utilizing the responsibilities and capacities of a number of agencies.

Let me illustrate the problem that we face here. We have already discussed a moment ago the fact that there are some very large amounts of money being spent by a number of agencies in support of graduate research, and that those funds also provide stipends for a large number of graduate students. In the Department of Defense, for example, in the accomplishment of mission research at universities supported by agencies such as the Office of Naval Research and the Air Force Office of Scientific Research and the Army Research Office—that those research dollars also provide a very important mathematics and science education result.

The key to this integrated Federal program that I noted, is the capacity to bring together in a comprehensive plan all of the elements that we have talked about, including the support of research and its educational component—but to do this in a way that does not take that particular activity away from the mission agency that needs to accomplish it for other reasons. So that we are looking for a synergistic relationship between the various agencies in order to accomplish what we consider to be important national goals.

Senator BINGAMAN. I think I understand how it is being done. I guess I still have a great concern that coordination and integration are certainly useful goals, and I applaud them, and I think it is

great that the initiative has been shown to do this. But, I wonder if one agency is not given a responsibility for making it happen, how well we can expect it to happen? That is my concern.

I know the FCCSET committee looking at supercomputers is the same thing. Instead of giving a particular agency responsibility for having anything happen there, we have a committee that is sort of integrating it and coordinating it. It makes it tough to enforce any accountability, which is my concern. I assume you folks understand that problem.

Dr. RATCHFORD. Life is not simple, Mr. Chairman, and we have to make tradeoffs.

Senator BINGAMAN. I am very pleased that we have a Secretary of Energy who is qualified and committed and able to head up our efforts in math and science education, but that is a rare circumstance where the Secretary of Education would be put to one side and the head of the National Science Foundation would be put to another side and see the Secretary of Energy appointed to do the job. It is an unusual way to structure things. It is a little bit jury-rigged which I am sure you are well aware of.

Let me ask Dr. Decker a couple of questions. You indicate that your authority, your statutes, in your view give the Department of Energy clear authority to pursue the activities you are pursuing in science, engineering and math education, and you have no reservations about that? There is no need for more specific authority in that respect?

Dr. DECKER. So far I think we have not run into any situations where we felt we needed additional authority, although it is something that we are currently reviewing.

Senator BINGAMAN. Well, if you would like any help out of our committee, you need to review it quickly enough that we can do something about it before we mark up our defense bill this year.

Dr. DECKER. Okay, we will do that.

Senator BINGAMAN. I guess on the issue of all the activities—and I am very impressed with the range of activities that are being pursued at various laboratories around the country—I do have a question as to the extent to which the Department of Energy is providing leadership on that or direction on the kinds of activities you want to see pursued out of the Federal laboratories or whether you are essentially leaving it up to each laboratory to design their own system. I do not know which is best at this early stage. Perhaps not early, but I think a lot of the things going on are relatively new, and maybe you need to work with them awhile before you decide what works and what does not.

I would be anxious to hear your thoughts on that.

Dr. DECKER. I think it has been a little bit of both. We have a base program at each of the major laboratories that carries out nationally competitive programs like the laboratory cooperative program and high school honors program. We have, of course, also charged the laboratories with coming up with new initiatives, and they have been coming up with new initiatives now for a period of several years.

When we find something that is a winner, then we encourage other laboratories to copy that particular activity. We are still seeing very innovative proposals coming in from the laboratories,

especially in the pre-college level. So, I think it will continue to be sort of a two-way process.

Senator BINGAMAN. All right. Let me just ask Dr. Ratchford one more question. Have you made any assessment at all, or has your office made any assessment at all, about the Department of Defense activities in connection with science, engineering and math education? Would you have any recommendations for us about what we should do to help the Department of Defense to be a more effective player in this effort that you are trying to pursue government-wide?

Dr. RATCHFORD. First, in response to your question, has there been any interaction between our office and the Department of Defense in this area. The answer is yes. And specifically, it was in the development of this report, which was submitted to you. So, in one way you have already provided assistance to them and to us, by your concern over this area and by your requirement of the development of such a report.

The figures that are listed in table three of Ted Berlincourt's testimony, I think it is fair to say, would not have been available had it not been for your interest and the requirement of the legislation last year.

The question of how your subcommittee can assist in the future is, I think, an extension of what you have done already. The agencies, as well as our office and the White House, need to be reminded of the broader interests of the Congress in mathematics and science education—the needs for the mission agencies to pay their way, in terms of training and education, not only for their own employees, but for the broader society.

The Department of Defense is a major user of technological, scientific and engineering manpower in this country, and increased recognition of that utility and the need to assure its long-range availability is important. And I think the roles that you personally and that your subcommittee has in assuring this are important.

Senator BINGAMAN. Let me just ask this. I gather the Department of Defense runs one of the largest educational systems in the world?

Dr. RATCHFORD. Yes.

Senator BINGAMAN. Just with the elementary and secondary education that they provide to military personnel to the children of military personnel throughout the world. It would seem that if the Federal Government is interested in improving science and math education at the precollege level, there is no excuse why that cannot be done. Do you know what the status of that is in those schools?

Dr. RATCHFORD. I do not, Mr. Chairman.

Senator BINGAMAN. Would that be an appropriate thing for us to upgrade early on in the process? I mean if in fact we are going to strive to achieve the President's goal of having our students first in the world in science and math achievement, would you not think that those elementary schools that we fund and control from start to finish would be the place to start?

Dr. RATCHFORD. It certainly would, and in particular I would encourage attention to be given to the testing process. As you, I am sure, are aware, the President's goal of being first in the world in

math and science education by the year 2000 entails an ability to measure that status.

It would be interesting to know how the schools of the Department of Defense stand up against their peer organizations, peer institutions in this country. And the testing and evaluating process is an extremely import element of that.

Senator BINGAMAN. Do you know if the National Assessment of Educational Progress is done in those Defense Department schools as well?

Dr. RATCHFORD. The NAEP process is a sampling technique, and I do not know how many of the schools for military dependents are included in that sample.

Senator BINGAMAN. Well, I thank you both for your testimony. I think it has been very useful. And we will undoubtedly be in touch with you with additional questions as we go forward the rest of the year.

Dr. RATCHFORD. Thank you very much.

Senator BINGAMAN. Thank you. Why doesn't the second panel come forward now, and we will hear from the Department of Defense directly as to the activities they are pursuing.

Thank you very much for being here.

Dr. Berlincourt, are you going to make the presentation? Or both of you? How do you want to do this?

Dr. BERLINCOURT. I will start out, thank you, sir.

**STATEMENT OF TED G. BERLINCOURT, DIRECTOR, RESEARCH AND LABORATORY MANAGEMENT, DEPARTMENT OF DEFENSE; ACCOMPANIED BY FRANK P. CIPOLLA, ACTING DEPUTY ASSISTANT SECRETARY OF DEFENSE, CIVILIAN PERSONNEL POLICY**

Dr. BERLINCOURT. Mr. Chairman, I am Ted Berlincourt, Director of Research and Laboratory Management in the Office of the Director of Defense Research and Engineering, and here at the table with me is Mr. Frank Cipolla, Acting Deputy Assistant Secretary of Defense for Civilian Personnel Policy.

We are pleased to testify on behalf of the Department of Defense concerning our activities in the area of science and engineering education.

Mr. Chairman, I would first like to request that my prepared statement be entered into the record, and then I would like to summarize its contents briefly.

Senator BINGAMAN. We would be glad to include your statement in the record.

Dr. BERLINCOURT. Thank you.

DOD has a vital interest in the education of scientists and engineers and in the future availability of an adequate supply of scientists and engineers. Our national defense strategy is firmly based on utilization of superior technology to counter our adversary's numerical advantage.

For this strategy to be successful, it is essential that we possess a technologically sophisticated work force. That this need is appreciated at the highest levels of the Department is evident in Secretary Cheney's approval of the very cogent recommendations of the Task

Force on Human Resource Management in Science and Technology, year 2000.

The DOD directly employs more than 127,000 scientists and engineers in both civilian and military capacities, and they comprise 2.8 percent of the national pool of science and engineering manpower. In addition, DOD indirectly employs another 13 percent in the defense industry.

DOD supports 8 percent of the basic research and 12 percent of the applied research funded by the Federal Government at universities and colleges. The research supported is concentrated in disciplines important to DOD such as engineering, physical sciences, computer sciences and ocean sciences.

In the case of university engineering research, DOD support accounts for approximately half of the Federal total. Within these university contract and grant programs, DOD provides research assistantship support for over 8,000 advanced degree candidates. DOD also provides 540 Ph.D. fellowships for graduate study in disciplines critical to DOD needs.

At the undergraduate level DOD provides ROTC scholarships for some 13,000 science and engineering majors. Thus DOD makes a substantial contribution to the development of the human resources needed to ensure our national security.

But of concern to the Department are a number of current issues, which may have a deleterious effect on the future supply of scientists and engineers in the United States.

These issues include a projected shortfall of over 500,000 scientists and engineers by the year 2010, a projected shift in demographics away from groups that have traditionally provided the largest numbers of scientists and engineers, unfavorable performance in science and mathematics tests by the United States high school students when compared with students from other industrialized nations, a decline in the numbers of United States students pursuing careers in science and engineering and continued deterioration of compensation for Federal scientists and engineers relative to that which prevails in private industry and in academe.

In response to such challenges DOD has developed a number of programs to stimulate interest in science and engineering careers among pre-college students, to increase the participation of women and minorities in science and engineering, and to assist pre-college teachers of science and mathematics in keeping abreast of new developments in their fields.

In all cases these programs are consistent both with the DOD mission to provide for the national defense and with the authority granted DOD to perform that mission. A comprehensive review of all such new programs as well as ongoing programs has been provided.

You have already commented on this report. It is a highly informative report entitled, "Science and Engineering Education Activities of the Department of Defense," and it was prepared with the exceptional skill and insight of Dr. Fred Smidt of my office, who really deserves the primary credit for that.

Senator BINGAMAN. Is Dr. Smidt here?

Dr. BERLINCOURT. You bet he is.

Senator BINGAMAN. Thank you. It is an excellent report. Thank you.

Dr. BERLINCOURT. This report lists and describes nearly 100 discrete science and engineering education programs. They are diverse and comprehensive extending from the pre-college level to post-doctoral appointments in DOD laboratories. Clearly, time does not permit an item-by-item description, but I will mention just a few of these programs.

Under the DOD science and engineering apprenticeship program for high school students, more than 600 students are employed as apprentices on real research projects at 24 DOD laboratories for a 10-week period each summer.

I had the pleasure this last summer of meeting with all 670 apprentices—all at once—at their first orientation meeting to present the opening science address and to attempt to answer the very inventive and incisive questions which only such young and uninhibited minds can devise. Now that was entertaining.

In another program the Office of Naval Research is funding activities budgeted at $30 million over a 5-year period, which provide grants to historically black colleges and universities for research assistantship support for more than 100 undergraduates, for faculty research projects, for visiting scholars and for improved laboratory training.

These measures are designed both to produce useful research results and to enrich undergraduate experiences at historically black institutions and thereby to encourage students to enter and to complete undergraduate science and engineering courses of study.

The Air Force conducts a fellowship co-op program in the area of aeropropulsion technology. With current participation of 35 graduate students, this program invokes cooperation among five universities and five industrial firms and is designed to provide a secure supply of critically needed graduate degree engineers in the aeronautical propulsion field.

It's pertinent also that through a provision of H.R. 2544, the Department is seeking legislative changes in the Government Employees Training Act. These changes will allow for reimbursement of tuition expenses for Government employees completing courses in fulfillment of requirements for degrees in disciplines important to agency missions.

Senator BINGAMAN. That is not limited to math, science and engineering?

Dr. BERLINCOURT. No, it is not. And I say here, this will of course favorably impact other agencies as well, and it will extend beyond science and engineering to other high priority disciplines.

But enough of the examples. I can summarize simply by noting what you have already noted. Overall some 65,000 participants benefit from science and engineering education programs supported by DOD at a total cost of $340 million.

These figures include ROTC scholarships, but they exclude education and training activities such as the military academies and graduate schools, military technician training schools and overseas kindergarten through grade 12 schools for military dependents, all of which also contribute very significantly to the Nation's capabili-

ties in science and technology—a large commitment to science, engineering and education.

The Department has undertaken a number of studies to assess the impacts and effectiveness of the various types of programs being pursued. It is anticipated that the insights gained will provide valuable guidance on which approaches will be most effective in assuring that future DOD needs for science and engineering personnel will be fulfilled.

Mr. Chairman, thank you for the opportunity to testify on this important matter. Mr. Cipolla is prepared to address your questions regarding programs administered though the office of Civilian Personnel Policy, and I will be happy to respond to questions on programs administered through DOD R&D activities.

Thank you.

[The prepared statement of Dr. Berlincourt follows:]

STATEMENT BY

DR. TED BERLINCOURT

DIRECTOR RESEARCH AND LABORATORY MANAGEMENT

Mr. Chairman and Members of the Committee:

I am Dr. Ted Berlincourt, Director of Research and Laboratory Management, Office of the Director Defense Research and Engineering, and I have with me Mr. Frank Cippola, Acting Deputy Assistant Secretary of Defense for Civilian Personnel Policy, who is prepared to discuss issues relating to his area of responsibility.

We are pleased to testify on behalf of the Department of Defense (DoD) on our initiatives to strengthen the science and engineering (S&E) education programs of DoD and the nation. We have long based our national defense strategy on using superior technology to counter our adversaries' numerical advantage. However, a skilled and technologically sophisticated work force is required to develop, maintain, and utilize superior technology. There are a number of concerns about the current state of scientific and technical education and about expected demographic changes in the work force that may impact DoD's ability to carry out its mission in future years.

OVERVIEW

First let me put in perspective some of the DoD requirements for science and engineering expertise. The Department of Defense directly employs over three million people, two million active duty military personnel and one million civilians. Of the two million active duty military personnel, almost three-quarters of a million enlisted men and women are technicians and require a sound high school education in math and science. The officer corps requires a large number trained in technical disciplines to utilize and direct projects involving high technology weapons systems. Of the

one million civilians who work in DoD, approximately 100,000 or ten percent, are scientists and engineers of whom 25,000 are engaged in research and development in DoD laboratories and centers. The Department directly employs 2.8 percent of the nation's pool of scientists and engineers and indirectly impacts another 13 percent employed in defense related industries.

DoD supports strengthening the nation's science and engineering education infrastructure because our educational institutions produce the personnel needed at all levels to maintain the United States' defense posture--from the mathematically literate high school graduate who can be trained to operate and maintain our sophisticated weapons systems to the science or engineering Ph.D. graduate who conducts the basic research that may ultimately lead to a new scientific breakthrough.

Current issues with possible serious implications for the nation's defense posture include a projected shortfall of over 500,000 scientists and engineers by the year 2010; a projected shift in demographics away from the groups which have provided the largest numbers of scientists and engineers in the past; unfavorable performance by U.S. high school students in science and math tests relative to other industrialized nations; a decline in numbers of U.S. students pursuing S&E careers; and continued deterioration of pay and benefits of federal scientists and engineers relative to private industry and academia. These concerns have stimulated a number of studies, policy decisions, and program initiatives in the science and engineering education area.

The prediction of a shortfall in S&E personnel by the year 2010 was made several years ago by the National Science Foundation, prior to the recent developments in Eastern Europe which have markedly changed our perspective. There will clearly be a reduction in defense industry demand which will impact the supply of scientists and engineers. The Department has undertaken a

study, jointly sponsored by the Director of Defense Research and Engineering (DDR&E) and the Assistant Secretary of Defense for Force Management and Personnel (FM&P), to assess the future needs for S&E personnel. Another related study is addressing the projected shift in demographics, as expressed most concisely in the report, "Changing America: The New Face of Science and Engineering," prepared in 1988 by the interagency Task Force on Women, Minorities, and the Handicapped in Science and Technology. The study will assess the impact of these trends on DoD employment and will recommend intervention programs to influence the career choices of these groups.

The Department of Defense has long been a champion of basic research and currently provides eight percent of the federal funds that go to universities and colleges for basic research. We have developed and sponsored many programs over the years to foster S&E training as a byproduct of the research and to stimulate advanced degree education in disciplines of critical importance to DoD. We are of course aware that the decline in U.S. citizens pursuing degrees in science and engineering is a long lead time pipeline problem that must be dealt with on a time scale that affects career choices in the pre-college years. Dr. Fred Smidt, of my staff, has prepared a report for the committee entitled "Science and Engineering Education Activities of the Department of Defense," which was recently transmitted to you. This report provides a comprehensive review of the science and engineering education activities of the Department, at all levels of education, both external and internal. I recommend it for your reading and will only summarize the major programs and trends in my testimony.

## DOD SCIENCE AND ENGINEERING EDUCATION PROGRAMS

The Department of Defense has three major focal points for science and engineering education programs; a) the conduct of research, b) the training and maintenance of skills in its civilian S&E personnel, and c) the training and recruiting of personnel with

appropriate technical backgrounds for the officer corps of the armed services. Each of these areas supports the mission of the Department to provide for national security and each has specific statutory authority. The DoD has other involvement in education such as the Service academies, post-graduate schools, the Department of Defense Dependents School system, recruit training, technical training schools, pilot training, etc. These activities, however, are not primarily science and engineering education programs and therefore will not be considered further here. It should be noted that while DoD has a clear interest in and concern for maintaining an adequate supply of well-trained scientists and engineers, it does not have the broad mandate and authority to develop and conduct science and engineering education programs that the National Science Foundation and the Department of Education have. The DoD mission is to provide for national security, and any education programs it conducts must be in direct support of that mission.

The DoD is authorized by Section 2358 of Title 10, United States Code, to conduct basic and applied research that relates to weapons systems and other military needs by contract or grant to educational institutions. These programs are administered through the research program offices of the Services; the Army Research Office (ARO), the Office of Naval Research (ONR), and the Air Force Office of Scientific Research (AFOSR), and the Defense Agencies, primarily the Defense Research Advanced Projects Agency (DARPA). These activities are coordinated by my office. The major S&E education activities of the research program offices are summarized in Table 1, which shows the activity, the number of participants, and the support level for FY 1989.

The largest program is for the Research Assistantships supported through research contracts and grants at universities. National Science Foundation statistics show there are over 8,000 graduate students supported through these programs by DoD at a cost

per student of approximately $19,000 per year for salaries and fees. These are a very important byproduct of the research program because they train students in disciplines of importance to DoD and in a setting where proper facilities are available to learn state-of-the-art research methods. Total direct cost for support of Research Assistantships is approximately $156 million per year.

Fellowship programs for graduate study are the next largest program with 541 fellowships provided by the Services and DARPA during FY 1989 at a cost of $20 million dollars per year. These fellowship programs include 120 to 150 Fellows supported by each of the Services plus the new National Defense Science and Engineering Graduate Fellow (NDSEG) program supported by the Services and DARPA. These programs target specific disciplines in the physical sciences, environmental sciences, math and computer science and engineering fields that are critical to DoD and for which there is a limited supply of trained people. The NDSEG program funding of $10 million per year provides support for 126 students for three-year appointments. An additional 120 Fellows were added in FY 1990 and a final increment of 120 will be added in FY 1991 so that the program will ultimately have 360 students under fellowship support for any given year. Specific authorization for the NDSEG Fellow was added to Title 10 U.S. Code as Section 2191 last year. Fellowships typically provide stipends of $15,000 the first year, $16,000 the second year, and $17,000 the third year plus tuition and fees for the Fellow and $2,000 per year, in support to the University Department where the Fellow is enrolled.

Other major programs include post-doctoral research and faculty research programs. The post-doctoral programs at DoD laboratories are some of the oldest programs, dating to 1957, and some of the most effective in terms of recruiting staff for the laboratories. The largest is operated by the National Research Council both for DoD and several other Federal agencies. DoD

provided support for 340 post-doctoral associates in 1989 at a cost of $12 million. Summer Faculty programs provided ten-week summer experiences for approximately 475 faculty members and served to acquaint them with research opportunities and areas of interest to DoD. The Young Investigator program of ONR and the Research Initiation program of AFOSR are designed to acquaint new faculty members or faculty not previously involved in DoD research, respectively, with research opportunities and needs of the DoD.

The predicted shift in demographics has underscored the need to interest more minorities and women in careers in science and engineering. The research program offices have demonstrated innovative leadership in developing programs to communicate with these groups. The Uninitiated Introduction to Engineering (UNITE) program is a 4-week science camp experience supported by ARO for approximately 700 pre-college minority youth. The Historically Black College/ Minority Institutions (HBCU/MI) program of ONR is a major initiative to increase the number of S&E graduates from these institutions. ONR will spend $6.5 million per year over the next five years in a comprehensive program to provide research grants to faculty, provide direct support for over 100 undergraduate scholarships and research associateships, provide summer faculty and student research experiences, and support visiting scholars. Each of the schools awarded a major grant will complement the ONR program with pre-college programs to stimulate interest in science, math and engineering career fields among minority students and to improve the quality of science and math education at the pre-college level.

The final area of activity is sponsorship of programs to stimulate interest in science, math and engineering at the junior and senior High School level and programs to provide research experiences for high school teachers. The Junior Science and Humanities Symposium sponsored by ARO was begun in 1957, well before the current surge of interest in this problem, and involves

approximately 10,000 students in two or three-day regional meetings that include presentations by the students on personal research projects; tours of DoD facilities; lectures on subjects of current interest; and a keynote appearance by a science celebrity. Another approach is the DoD Science and Engineering Apprenticeship Program for High School Students. This program began in the Washington, D.C. area in 1981 but has now expanded to the Philadelphia-Baltimore-Annapolis area with 667 participants in 24 laboratories. The students work in the laboratories on real research projects under the tutelage of DoD scientists for a period of ten weeks during the summer. The program is administered in the Washington area for all Services and agencies by ONR under a contract to George Washington University. Another aspect of the program involves the participation of high school teachers who receive additional academic work prior to the ten-week program as well as hands-on research experience. They also assist in supervising the activities of the students, especially during preparation and presentation of reports of their research.

EDUCATION PROGRAMS SUPPORTED BY PERSONNEL AND EEO OFFICES

A number of Federal personnel and EEO programs can be utilized to support S&E education and are so utilized by the DoD. A list of the major programs is provided in Table 2 and in-depth descriptions of each of the programs is provided in the report. These programs apply to civilian employees of the DoD or students who are given special access to the programs through Office of Personnel Management (OPM) regulations, and are treated as government employees for the purpose of the program. Among these latter programs are Summer Aid/Stay in School, Federal Junior Fellow, Summer Employment, and Cooperative Education programs. All these programs provide the students with an opportunity to gain work experience in a research setting and hopefully instill in them an interest in science and engineering careers. The most successful of these programs is the Co-op program which provides

advanced undergraduate and graduate students the opportunity to alternate semesters of work in DoD laboratories and centers with their education on campus. Our survey indicated there were approximately 2300 co-op students in DoD laboratories during FY 1989 at a cost of salary support of approximately $16 million. Our experience indicates this is a very effective program for recruiting staff with a retention rate of 65-75 percent reported by some organizations.

Training programs directed at the full-time permanent DoD employee are an important vehicle for advancing the knowledge of DoD employees. Tuition is paid for all job-related college courses taken. Several programs allow the pursuit of full-time education after three years of government service with a commitment incurred of three years Federal service for each year of education paid by DoD. The career intern programs which recruit S&E students directly from campus and provide them with specialized job experience and some additional education are also a very successful recruiting device for entry-level scientists and engineers.

ROTC SCHOLARSHIP PROGRAMS

The third program mentioned in my preliminary remarks was the ROTC program. The ROTC scholarship program serves as a major mechanism of support for undergraduate science, engineering and math training. During FY 1989 there were approximately 22,000 ROTC scholarships awarded and of this total approximately 13,000 or 60 percent were to S&E majors. The scholarships pay about $8,000 per year for tuition, fees, and a stipend for subsistence and summer training activities. Total cost for the S&E portion of the program was $105 million in FY 1989. The graduates incur a four-year active duty military service commitment although they may serve in the Reserves at the convenience of DoD. Reductions-in-force anticipated in the next several years will reduce the number of officers commissioned through ROTC programs, but the number of scholarships offered is anticipated to remain fairly constant.

In conclusion, The Department of Defense has a vital interest in maintaining the supply of scientists and engineers needed for the future welfare of the nation. We maintain a wide variety of programs which support science and engineering education at all levels from pre-college to post-doctoral, as summarized in Table 3. The survey of S&E education and training activities in the DoD conducted in preparation of the report showed at least 65,000 people were affected at an investment of over $340 million per year. We are proud of this record and look forward confidently to the challenges ahead.

Thank you for the opportunity to present testimony to the committee on this very important subject. Mr. Cippola and I will be happy to address any questions the committee may have on this matter.

TABLE 1

SCIENCE AND ENGINEERING EDUCATION PROGRAMS SUPPORTED BY RESEARCH OFFICES (ONR, AFOSR, ARO: R&AT(RLM) COORD.) - FY 1989

| | SERVICES | PARTICIPANTS | SUPPORT ($K) |
|---|---|---|---|
| 1. RESEARCH ASSISTANTSHIPS | All | 8235 | $156,500 |
| 2. FELLOWSHIPS | | | |
| ONR FELLOWS | N | 139 | 4,100 |
| URI FELLOWS | A | 158 | 3,163 |
| LAB GRAD FELLOW | AF | 50 | 1,661 |
| AFRAPT FELLOW | AF | 45 | 908 |
| ATRI FELLOW | AF | 20 | 465 |
| JT. SERV. ELECT. FEL. | ALL | 3 | 90 |
| NDSEG FELLOW | ALL | 126 | 10,006 |
| TOTAL | | 541 | 20,393 |
| 3. POST-DOCS | | | |
| NRC | ALL | 239 | 7,624 |
| ONT | N | 77 | 2,185 |
| UNIV. RESIDENT RES. | AF | 24 | 1,942 |
| TOTAL | | 340 | 11,751 |
| 4. FACULTY | | | |
| SUMMER FACULTY | ALL | 474 | 5,339 |
| YOUNG INVESTIGATOR | N | 44 | 2,530 |
| RESEARCH INITIATION | AF | 75 | 1,700 |
| TOTAL | | 593 | 9,569 |
| 5. HBCU/MI | | | |
| HBCU/MI* | N | 200 | 6,500 |
| UNITE | A | 686 | 105 |
| WOMEN SCHOLARS | N | 6 | 174 |
| TOTAL | | 892 | 6,779 |
| 6. PRE-COLLEGE | | | |
| H.S. APPRENTICE | ALL | 960 | 1,765 |
| H.S. S&M FACULTY | A | 128 | 543 |
| JR SCI&HUM SYMPOSIUM | A | 10000 | 850 |
| SCIENCE FAIR AWARDS | A&N | 1115 | 250 |
| NATL SCI RES CNTR* | DDR&E | 5000 | 300 |
| TOTAL | | 17203 | 3,708 |
| GRAND TOTALS | | 27804 | 208,700 |

* These broad programs affect entire schools to some degree, estimates of participants are long term involvement.

TABLE 2

EDUCATION PROGRAMS SUPPORTED BY PERSONNEL AND EEO OFFICES

Adopt-A-School

Student Volunteer

Summer Aid/Stay-in-School

Junior Fellow

Summer Programs

1040 Hour appointment

Co-op

Targeted

Career Intern

Training

TABLE 3

SUMMARY OF SCIENCE AND ENGINEERING EDUCATION PROGRAMS
BY EDUCATION LEVEL AND PURPOSE - FY 1989

| | PARTICIPANTS | FUNDING ($K) |
|---|---|---|
| PRE-COLLEGE LEVEL | | |
| IMPROVE QUALITY | 5128 | 793 |
| STIMULATE CAREER INTEREST | 12,247 | 1,137 |
| PROVIDE EXPERIENCE | 968 | 1768 |
| TARGETED | 735 | 108 |
| TOTAL | 19,078 | 3,806 |
| UNDERGRADUATE LEVEL | | |
| ROTC SCHOLARSHIP | 13,147 | 106,331 |
| PROVIDE EXPERIENCE | 376 | 1,516 |
| TARGETED | 228 | 7,088 |
| EMPLOYEE TRAINING | 527 | 7,792 |
| TOTAL | 14,278 | 122,727 |
| BOTH UNDERGRADUATE & GRADUATE LEVEL | | |
| PROVIDE EXPERIENCE | 758 | 2614 |
| TARGETED | 3 | 40 |
| EMPLOYEE TRAINING | 20,251 | 5,457 |
| TOTAL | 21,032 | 8,111 |
| GRADUATE LEVEL | | |
| FELLOWSHIPS | 541 | 20,393 |
| RESEARCH ASSISTANTSHIPS | 8,337 | 157,310 |
| EMPLOYEE TRAINING | 1189 | 6,479 |
| TOTAL | 10,067 | 184,182 |
| POST-DOCTORAL/FACULTY LEVEL | | |
| RESEARCH APPOINTMENTS | 933 | 21,320 |
| TARGETED | 13 | 189 |
| TOTAL | 946 | 21,509 |
| GRAND TOTAL | 65,376 | 340,335 |

Senator BINGAMAN. Mr. Cipolla, did you wish to make any comments at this point?

Mr. CIPOLLA. No, not at this point.

Senator BINGAMAN. Let me ask first about the issue which I think you address in your testimony about the fact that science engineering and math education is basically not a Department of Defense responsibility. As you see it, you have limited authority in this area, but I guess that I would just like you to expand on that view for a little while. That is the message which I got from reading through your testimony.

The previous witness, Dr. Decker, said that in his view, or in the Secretary of Energy's view, that DOD does have authority to pursue science, engineering and math education under two statutes. Do you believe you lack that same authority?

Dr. BERLINCOURT. As I commented, with regard to H.R. 2544 we are seeking that authority for an area where we would like to see some changes made which will be very beneficial.

Senator BINGAMAN. That is just as to your employees?

Dr. BERLINCOURT. Yes, that is correct. Now of course, as you have seen with this report, we do have a great number of projects which

are very supportive of science and engineering education. I think you will find in each of those instances, however, that they can be justified in terms of their research responsibility, which we conduct under the existing authority. So, I think there is a great deal of latitude to conduct that kind of activity.

Senator BINGAMAN. I guess what I am sort of groping for here is, would it be helpful to have a more direct statement in law that part of the mission of the Department of Defense in providing for the national security is to support the education in those disciplines that are essential for national security, in particular in science, engineering and math, which seem to be most directly related to the activities the Department of Defense pursues? Is something like that helpful? Is it already in the law? What is your thought on that?

Dr. BERLINCOURT. I am no expert on that. I only know every time we put forward a new approach which is concerned with education that we bounce it off our general counsel very carefully and we find there is a great deal of latitude that allows us to have very creative and useful programs. Our authorization under Title 10, of course, is to do research, and the other authorities under Title 5, as I understand, cover personnel.

Senator BINGAMAN. So you think in a general way there is authority there?

Dr. BERLINCOURT. I beg your pardon?

Senator BINGAMAN. Your statement is, in a general way the authority is there to pursue the types of programs that you think need to be pursued?

Dr. BERLINCOURT. I think it is there to allow us to do programs of the type we have done in the past and which we would certainly like to continue in the future. On page 5 of the report, there is a tabulation of those sources.

Senator BINGAMAN. Let me also ask you about the way the Department of Defense organizes itself. It seems to me that there is no real clear, central responsibility in DOD for this function—for the performance of these activities. Some of it is in your office. Mr. Cipolla has some of it in his responsibility, as I understand it. There may be other places in the Department of Defense which claim some part of this responsibility. Could you comment on that? How is the Department of Defense organized to accomplish this?

Dr. BERLINCOURT. Of course, the Department of Defense is very large and is in a sense a microcosm of the Federal Government in general. We do practice a certain amount of decentralization because it is such a large and complex organization. However, I believe that our activities in science, engineering and education are quite well-structured as a result of the statutes, regulations and the policies that govern our activities. We rely very heavily, of course, upon individual operational portions of the Department of Defense to carry out those regulations and statutes and dictates.

At the same time, of course, within the Office of the Secretary of Defense we have a modest oversight staff such as Mr. Cipolla's and my own that assure that there is adequate cooperation and planning, implementation and execution.

Senator BINGAMAN. What occurs to me is that there are some excellent things going on in different spots around the country and,

in particular, at the service laboratories, for example. But there is not a very good system for spreading that to other laboratories, and there is no real central push to say look, the Air Force Weapons Lab in Albuquerque has got a very good summer program involving teachers, if that were the case, let us get this into the rest of the DOD laboratories and pursue this nationwide. I do not see that kind of central ability to direct that kind of activity. Am I missing something?

Mr. CIPOLLA. I can answer that, at least from one aspect, Senator. In September of 1988 the Secretary of Defense established a task force. Dr. Berlincourt alluded to that in his opening comments, and I believe we commented on it to some extent in the report itself. That task force was established to focus on scientific and technological needs within the Department of Defense for the year 2000 and beyond.

One of the primary objectives for that task force which has since been endorsed by Secretary Cheney in terms of its recommendations and its thrust, was to do just what you have suggested. That task force comprised representatives at the assistant Secretary level within OSD and the Military Departments from the personnel and research, development and engineering communities. We are still very much into the process that that task force kicked off and will be for some time.

We established a compendium of some 40 programs and interventions that already were in existence at the time, these, in addition to the ones that we accounted for in the report to the Congress, provided a real basis for us to do exactly what you are suggesting. And that is to let the rest of the world know what is working well, what is not working so well, and what we need to replicate or put on the shelf.

Dr. BERLINCOURT. I could comment on that also.

Senator BINGAMAN. Yes, go ahead.

Dr. BERLINCOURT. It is significant that the services' research offices fund about half of the total science and engineering education activity within DOD. They meet regularly with me through the Committee on Research which provides an excellent forum for the transfer of the good ideas. In fact, a number of our programs are tri-service programs.

I would also like to comment that again, our yellow report, which I keep waving here, does serve as an excellent compilation of these programs and will be used to very good advantage in informing various components within DOD as well as outside DOD of successful programs.

Senator BINGAMAN. When you get to the recommendations, it says intermediate recommendations. "Department of Defense components will implement a systematic plan to expand intervention programs to meet future needs in scientific, engineering and technological occupations." And then it goes on to say, "Component plans should be completed by December 31st of 1989." Whose responsibility is it to be sure that was done?

Mr. CIPOLLA. That is our responsibility in the Office of Assistant Secretary for Force Management and Personnel, and the first part of that recommendation—really the first parts of the plans developed by the components—were, in fact, received. They are now

being evaluated for cost-effectiveness to determine which ones work better than others.

We have the Logistics Management Institute, which conducts some ongoing studies for us on force management issues, actually looking into that. They will be providing us a report that will answer those specific questions about how effective the components' plans are and their projections about where we need to go from here. That is already underway.

Senator BINGAMAN. That results in a DOD plan of action with regard to science and engineering education. Is that what you are saying to me?

Mr. CIPOLLA. It could, depending on the nature of the review and the specific evaluations. In some respects we may well have programs and interventions that ought to be applied DOD-wide, and others that may be service-specific—and we would leave them that way. But it is premature to make that judgment. It is possible.

Senator BINGAMAN. It strikes me that what we really need—and maybe this just shows my own predilection in this thing—but what we really need is a DOD plan. Just like you have the 5-year defense plan, you need a 5-year plan for what the Department of Defense is going to try to see accomplished in this area and try to support in this area. And then the Secretary of Defense needs a person who he can hold accountable for implementing that plan. Is there anything like that in the works? First, is there a plan in the works which would lay out a 5-year plan of action?

Mr. CIPOLLA. Nothing in the works yet. Our idea with the Secretary's task force and the White Paper that you referred to was first to determine what is out there, and then to try to evaluate as well as we could what is there. Then, we would determine what sort of planning, be it DOD plan or component plans that we would have to construct from that point on. We are not really much beyond the first step yet.

Senator BINGAMAN. One of my concerns on the whole thing is testimony I have heard and things I have read about science and math education indicate that a student will decide whether to pursue a career in science or math or engineering by the seventh grade, and if they have not decided to do it by the seventh grade, you have pretty much lost them. Is that consistent with what you folks have read?

Mr. CIPOLLA. Yes, sir.

Senator BINGAMAN. And then when you look at Table 3 attached to your testimony, Dr. Berlincourt, we are giving scant attention to that early period, and maybe that is because DOD has not felt they had a way to do that or a responsibility to do it. I do not know all the reasons, but when you look at the $340 million, right at 1 percent is devoted to the pre-college level. And everything I read indicates that is where most of the decisions are made, long before people get to college, about whether they are ever going to pursue careers in this field.

Now, as I say, maybe that is something DOD feels like it has to take those who have already made that decision and try to persuade them to work for the Department of Defense and not try to get more people into the pipeline. I do not know if you have any thoughts on that. I would be interested in hearing them.

Dr. BERLINCOURT. I cannot really speak with any authority on any policy within the Department on that particular topic, so this would just be a personal observation that probably we are not as well equipped as the Department of Education to deal at that very young age. Our interactions are pretty heavily oriented toward more advanced education.

Senator BINGAMAN. I certainly understand that, and I think that is clear, but I do think, for example, the Department of Energy has some summer programs and some other programs that are trying to interest minority youth and youth in general in pursuing science and engineering activities. I guess that exists to an extent in the services as well.

Dr. BERLINCOURT. We do have some programs at the introductory level of science, at the very beginnings, through the Smithsonian Institution. That is the National Science Resources Center, and that is page 11 of the yellow book.

Senator BINGAMAN. How many students does that reach each year?

Dr. BERLINCOURT. It mentions in here that a workshop conducted in 1987 involved schools with enrollment of over 500,000 students.

Senator BINGAMAN. But that has not been done since 1987?

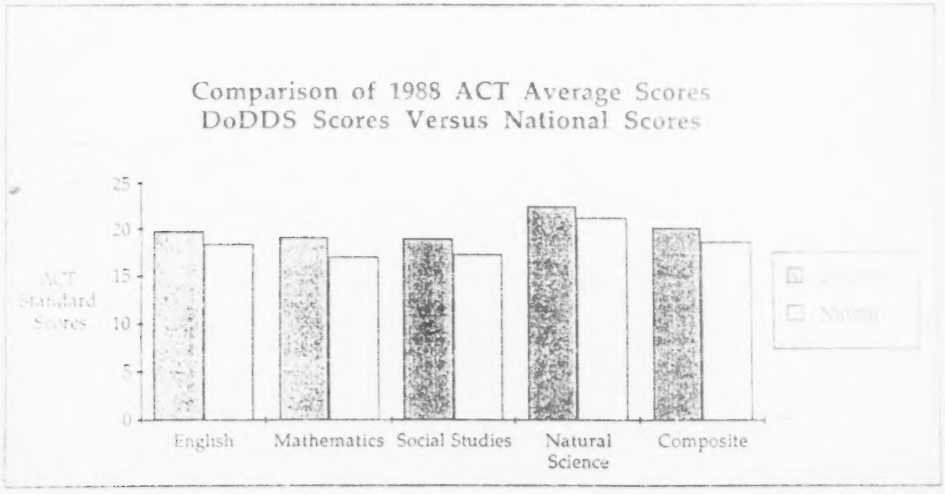
Dr. BERLINCOURT. No, that is an on-going program to develop the materials for the introductory science courses, and those materials are very widely distributed I think is the point.

Senator BINGAMAN. Do you know if there has been any assessment of the quality of math and science education within the schools run by the Department of Defense?

Dr. BERLINCOURT. Yes. In fact, I do not know if they were specific to math and science, but in general the SAT scores and the various testing that is performed shows them to be above the national average. Their scores are above the national average.

Mr. CIPOLLA. We could get specific information for you, senator. It is available.

[The information follows:]



## DoDDS Mean Percentile Scores*
## For Subject Areas by Grade

| GRADE | Reading 88 | 89 | Dif | Language Arts 88 | 89 | Diff | Mathematics 88 | 89 | Diff | Social Studies 88 | 89 | Diff | Science 88 | 89 | Diff |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 58 | 59 | +1 | 64 | 67 | +3 | 63 | 67 | +4 | - | | | - | | |
| 5 | 64 | 66 | +2 | 71 | 72 | +1 | 64 | 67 | +3 | - | | | - | | |
| 7 | 67 | 67 | | 72 | 73 | +1 | 69 | 71 | +2 | 69 | 70 | | 70 | 72 | +2 |
| 9 | 60 | 62 | +2 | 68 | 69 | +1 | 68 | 70 | +2 | 73 | 75 | +2 | 67 | 69 | +2 |
| 11 | 60 | 60 | | 69 | 68 | -1 | 67 | 67 | | 72 | 72 | | 62 | 63 | +1 |

*Percentiles based on the mean scale score
National Norm = 50th Percentile

## Total Mathematics
## Mean Percentile Scores
## By Grade and Region

| GRADE | ATLANTIC 88 | 89 | Diff | GERMANY 88 | 89 | Diff | MEDITERRANEAN 88 | 89 | Diff | PACIFIC 88 | 89 | Diff | PANAMA 88 | 89 | Diff |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 62 | 72 | +10 | 59 | 65 | +6 | 67 | 65 | -2 | 72 | 72 | | 82 | 81 | -1 |
| 5 | 69 | 76 | +7 | 61 | 64 | +3 | 69 | 69 | | 69 | 69 | | 86 | 87 | +1 |
| 7 | 73 | 71 | -2 | 65 | 69 | +4 | 73 | 71 | -2 | 74 | 73 | -1 | 74 | 74 | |
| 9 | 72 | 76 | +4 | 65 | 70 | +5 | 72 | 70 | -2 | 70 | 68 | -2 | 76 | 74 | -2 |
| 11 | 71 | 69 | -2 | 62 | 64 | +2 | 67 | 67 | | 69 | 67 | -2 | 73 | 64 | -9 |

## Total Science
## Mean Percentile Scores
## By Grade and Region

| GRADE | ATLANTIC 88 | 89 | Diff | GERMANY 88 | 89 | Diff | MEDITERRANEAN 88 | 89 | Diff | PACIFIC 88 | 89 | Diff | PANAMA 88 | 89 | Diff |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | 75 | 72 | -3 | 65 | 70 | +5 | 75 | 74 | -1 | 75 | 76 | +1 | 75 | 75 | |
| 9 | 69 | 74 | +5 | 66 | 69 | +3 | 69 | 69 | | 66 | 67 | +1 | 69 | 72 | +3 |
| 11 | 68 | 66 | -2 | 59 | 71 | +12 | 65 | 63 | -2 | 63 | 63 | | 65 | 65 | |

**Total Mathematics Mean Scale Score Comparisons Between Nation, System, and Five DoDDS Regions**

| GRADE | NTL | SYSTEM | | ATLANTIC | | GERMANY | | MEDITERRANEAN | | PACIFIC | | PANAMA | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1988 | 1989 | 1988 | 1989 | 1988 | 1989 | 1988 | 1989 | 1988 | 1989 | 1988 | 1989 |
| 3 | 635 | 647.4 | 651.1 | 646.2 | 655.4 | 643.6 | 648.6 | 651.2 | 648.6 | 654.9 | 654.7 | 6665.9 | 664.2 |
| 5 | 686 | 697.2 | 699.4 | 699.5 | 703.7 | 694.6 | 697.2 | 700.9 | 700.5 | 699.5 | 700.7 | 710.3 | 710.8 |
| 7 | 711 | 721.1 | 721.9 | 723.4 | 722.4 | 719.3 | 721.3 | 722.7 | 721.8 | 723.5 | 723.0 | 723.5 | 725.2 |
| 9 | 729 | 737.4 | 738.0 | 739.0 | 740.6 | 736.4 | 737.5 | 738.7 | 738.1 | 737.9 | 737.2 | 740.9 | 740.3 |
| 11 | 737 | 744.6 | 744.5 | 746.8 | 745.7 | 743.1 | 744.0 | 745.1 | 745.1 | 745.8 | 745.0 | 747.7 | 744.4 |

**Mathematics Computation Subtest Mean Scale Score Comparisons Between Nation, System, and Five DoDDS Regions**

| GRADE | NTL | SYSTEM | | ATLANTIC | | GERMANY | | MEDITERRANEAN | | PACIFIC | | PANAMA | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1988 | 1989 | 1988 | 1989 | 1988 | 1989 | 1988 | 1989 | 1988 | 1989 | 1988 | 1989 |
| 3 | 643 | 656.6 | 659.6 | 652.4 | 660.1 | 652.8 | 657.5 | 660.4 | 656.1 | 665.0 | 664.9 | 675.5 | 671.7 |
| 5 | 699 | 707.2 | 708.9 | 708.7 | 712.5 | 705.0 | 706.7 | 711.0 | 710.5 | 708.4 | 710.0 | 722.0 | 722.2 |
| 7 | 721 | 729.5 | 729.7 | 729.0 | 728.7 | 728.7 | 729.4 | 728.5 | 728.0 | 731.7 | 730.9 | 732.7 | 733.9 |
| 9 | 736 | 743.3 | 743.6 | 744.7 | 744.2 | 742.5 | 743.2 | 743.7 | 742.8 | 743.4 | 742.9 | 748.5 | 746.2 |
| 11 | 741 | 748.6 | 748.9 | 750.4 | 749.3 | 747.5 | 748.5 | 748.5 | 748.8 | 749.7 | 749.4 | 752.2 | 749.7 |

**Mathematics Concepts Subtest Mean Scale Score Comparisons Between Nation, System, and Five DoDDS Regions**

| GRADE | NTL | SYSTEM | | ATLANTIC | | GERMANY | | MEDITERRANEAN | | PACIFIC | | PANAMA | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1988 | 1989 | 1988 | 1989 | 1988 | 1989 | 1988 | 1989 | 1988 | 1989 | 1988 | 1989 |
| 3 | 625 | 637.7 | 642.1 | 639.3 | 650.2 | 633.7 | 639.2 | 641.4 | 640.7 | 644.0 | 644.1 | 656.8 | 656.2 |
| 5 | 675 | 686.7 | 689.3 | 689.5 | 694.2 | 683.7 | 687.1 | 690.2 | 690.1 | 690.1 | 691.0 | 698.2 | 698.8 |
| 7 | 698 | 712.1 | 713.7 | 717.4 | 715.5 | 709.4 | 712.6 | 715.2 | 715.1 | 714.8 | 714.6 | 713.9 | 716.1 |
| 9 | 723 | 730.9 | 731.9 | 732.8 | 734.8 | 729.7 | 731.3 | 733.1 | 732.6 | 731.7 | 730.9 | 732.8 | 734.0 |
| 11 | 732 | 739.9 | 739.6 | 742.7 | 741.7 | 738.2 | 738.9 | 741.2 | 740.5 | 741.4 | 740.0 | 742.8 | 738.4 |

See table 6 for number of students tested.

Percentages of Graduates in Various ACT
Test Score Intervals
1988

| | MEAN | Test Score 1-15 | Test Score 16-20 | Test Score 21-25 | Test Score 26-36 |
|---|---|---|---|---|---|
| English | | | | | |
| DoDDS | 19.9 | 17% | 35% | 36% | 12% |
| National | 18.5 | 26% | 34% | 32% | 8% |
| Math | | | | | |
| DoDDS | 19.2 | 34% | 17% | 26% | 24% |
| National | 17.2 | 42% | 19% | 23% | 16% |
| Social Studies | | | | | |
| DoDDS | 19.1 | 32% | 19% | 27% | 22% |
| National | 17.4 | 41% | 20% | 23% | 15% |
| Natural Sciences | | | | | |
| DoDDS | 22.6 | 15% | 24% | 24% | 38% |
| National | 21.4 | 19% | 25% | 26% | 29% |
| Composite | | | | | |
| DoDDS | 20.3 | 21% | 28% | 30% | 21% |
| National | 18.8 | 31% | 29% | 27% | 14% |

Key: 1-15 Low
16-20 Low Average
21-25 High Average
26-36 High

Senator BINGAMAN. I would be interested in seeing that, and I guess I would be interested in seeing information that talked about the program in the science and math curriculum that you teach. I think that demographics probably would dictate that the students in the military schools, children of military personnel that attend these schools would be above average, or as a group would score above average by virtue of the education level of their parents and other types of things, compared to the general population. I would assume that is the case, although I do not know, and I just wonder if there is a way to separate out how good a job we do in those schools in actually educating them in those areas.

Dr. BERLINCOURT. That would be a tough one.

Senator BINGAMAN. If you could find anything that talks about the program that we have, I would be anxious to see it.

[The information follows:]

The Department of Defense Dependents Schools (DoDDS) science and mathematics programs are or will be undergoing profound changes that will make them more responsive to student as well as national needs. The science curriculum will receive internal review this school year, while mathematics is the focus of a systemwide effort to improve teacher skills. Though becoming more rigorous, science and mathematics will be accessible to all DoDDS students.

DoDDS performance in these areas on national standardized tests is good. Specifically:

— Sixty percent of DoDDS students take SAT's. This places DoDDS in the top quarter of all States reporting participation in SAT's.

— DoDDS students who take the SAT's exceeded the national verbal score by 10 points in 1989 and equalled the national average in mathematics.

— Few DoDDS students elected to take the College Board Achievement Tests which include three areas of science: chemistry, physics, and biology. The scores of those electing the science achievement tests indicate below national averages in biology and physics and equivalency with the national average in chemistry.

— The scores of DoDDS students electing the mathematics achievement tests exceeded the national average.

*American College Testing Program*

— The scores of DoDDS students on this achievement test exceeded the national average in both science and mathematics.

*California Test of Basic Skills*

— DoDDS students scored above the national average on all elements of this test, which is administered systemwide on an annual basis in grades 3, 5, 7, 9 and 11.

The Annual Test Report to Congress will provide more detail on DoDDS student performance. Demographic information also is included in this report. DoDDS plans to release the report by August 30.

Senator BINGAMAN. Well, I have other questions, but I think what I might do is to submit those to you for the record and I think we will get back to you on some specific recommendations and things we might try to do in this year's defense bill to try to support what is going on.

I do think there are some good things going on in the Department of Defense, but I do not think we have got the same kind of top-level interest in this issue at DOD that we have at the Department of Energy, and I do not know that we are structured in a way, in the Department of Defense, to allow us to pursue a real focus on this area of activity. I guess I feel that it is a useful thing for us to do.

Who is the representative from the Department of Defense on this FCCSET Committee?

Dr. BERLINCOURT. Dr. George Millburn, Deputy Director of Defense Research and Engineering for Research and Advanced Technology.

Senator BINGAMAN. Does he have any responsibility in his job for the issue of education itself, other than the research that is funded?

Dr. BERLINCOURT. Yes. He is my supervisor.

Senator BINGAMAN. All right. We appreciate your coming very much, and we will be back in touch with additional issues and questions for you.

Thank you both.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR JEFF BINGAMAN

Senator BINGAMAN. In several places in your recent report, and in your testimony, you state that the Department of Defense has only limited authority to participate in science and engineering education programs. The 1990 Defense Authorization Act included, as a Sense of the Congress the direction "for the Secretary of Defense to take such actions as may be necessary and appropriate to promote and encourage, at precollege through post-doctoral levels, an increase in the number of citizens and nationals of the United States who pursue courses of study in science, engineering, and other technical disciplines." What additional legislative relief would you recommend that would provide DOD with the authority to participate more broadly?

Dr. BERLINCOURT. We are currently reviewing the statutory bases for existing and planned DOD science and engineering education programs. In instances where it appears appropriate to develop additional statutory foundations we will be pleased to

work constructively with the Congress toward that end. It appears that DOE has been successful in this area working under the authorities cited by Dr. Decker. Similar authorities might be appropriate for DOD.

Senator BINGAMAN. The report is careful to point out that under the law (pg. 37/ the Government Employees Training Act) and OPM regulations (pg. 5), government employees cannot be directly assisted in getting an undergraduate degree as a sole objective, but can be supported in education and training to maintain or improve skills in the individuals current career field. These restraints do not help graduating more scientists and engineers. Has DOD done anything to get relief from these restrictions?

Mr. CIPOLLA. I would agree with your assessment Senator and note that these regulations also apply to education in pursuit of advanced degrees, which is a major concern in training and recruiting our professional scientist and engineer workforce. A change in training regulations, to permit limited exceptions to these rules for career fields where the Government is encountering difficulty in recruiting and retaining employees, is proposed in H.R. 2544 as an administration goal for all Federal agencies and may provide some relief for this problem. Unfortunately, there are other provisions of this particular bill that are not favored by the administration, so we believe this concept is important to help alleviate shortages in critical skill areas but the current vehicle is not favored.

Senator BINGAMAN. There are many of the programs described in the report that look very effective. To name a few, there's the Army's S&E ROTC Coop Program, the Air Force's Palace Knight program and the Navy's HBCU programs. What is your office doing to insure that all the services are fully cognizant of these programs, and any other good ones, and work to establish similar ones in their individual S&E education activity?

Dr. BERLINCOURT. A number of things are being done to insure coordination and to disseminate information on the programs. First, for those programs which are under the direction of the research program offices, we have regular meetings of the services and DARPA to review programs and discuss policy. Among the programs included here are the Fellowship programs, the HBCU/MI programs, the Women Science Scholars program and others listed in table 1. Second, studies such as the current report and the report of the Task Force on Human Resource Management for Science and Technology for the Year 2000 provide a resource for widely disseminating information on the activities DOD is currently supporting. Third, one of the actions resulting from the Task Force on Human Resources for the year 2000 was to collect information on all current science and engineering education programs and to develop recommendations for expanding those which were successful. The collection part of that action was done concurrently with the preparation of our report, and Mr. Cipolla's office is in the process of evaluating the programs and developing recommendations.

Senator BINGAMAN. The DOD cooperative school/work program is noted in the Report to be one of the department's more effective ways of recruiting scientists and engineers. Given the trouble DOD appears to be having in getting enough of these young people, what do you recommend be done to make co-op education in DOD even broader than it is now?

Dr. BERLINCOURT. The co-op education program is indeed a very effective program for acquainting students with the opportunities available in DOD and in providing the students with valuable work experience. To a large extent the ability to expand the program is constrained by the number of students who choose to extend the length of their undergraduate education by participating in a co-op program. Our ability to attract more students from the limited pool available is primarily hampered by the limits on Federal pay, travel allowances, re-location expenses, etc., areas in which we are at a disadvantage in competition with private industry.

Senator BINGAMAN. Is there any consideration being given to targeting S&E education disciplines to the critical technologies identified by DOD in their annual Plan?

Dr. BERLINCOURT. The Critical Technologies Plan is already having a useful impact on Department S&E education activities. However, it is only one of many such useful tools. Indeed it is not surprising that the areas included among the critical technologies, are also among the ones being actively pursued within DOD S&E education activities. In a sense it is a chicken-and-egg situation. It should be emphasized, however, that the "Critical Technologies Plan" is restricted in scope to 20 technologies, and that DOD has many additional high-priority technology interests which are also represented in Department S&E activities.

Senator BINGAMAN. In December 1988, then Secretary of Defense Frank Carlucci approved the recommendations of the White Paper on Human Resource Manage-

ment in Science and Technology for the year 2000. For the record, would you provide the committee with the current status of implementing the recommendations contained in that White Paper.

Mr. CIPOLLA. First, let me note that Secretary Cheney has endorsed the White Paper in a recent letter which I should like to submit for the record. One of the first actions stemming from the White Paper was the collection of information on existing programs and the development of component recommendations on expansion of intervention programs. Information on existing programs and evaluations of those programs was received in the December 1989-January 1990 time period. Logistics Management Institute, which conducts a number of studies for us, has been tasked to evaluate these programs for effectiveness and develop recommendations for future actions. Another recommendation of the White Paper was to assess the future needs and requirements of the Department for scientists and engineers. Logistics Management Institute is also conducting that study, which has assumed greater importance with the current changes in force structure.

THE SECRETARY OF DEFENSE,
*Washington, DC, March 30, 1990.*

MEMORANDUM FOR:
Secretaries of the Military Departments
Chairman of the Joint Chiefs of Staff
Under Secretaries of Defense
Director, Defense Research and Engineering
Assistant Secretaries of Defense
Comptroller
General Counsel
Inspector General
Director, Operational Test and Evaluation
Assistants to the Secretary of Defense
Director of Administration and Management
Directors of the Defense Agencies

SUBJECT: Department of Defense Task Force on Human Resource Management in Science and Technology: Year 2000

In November 1988, the Department of Defense Task Force on Human Resource Management in Science and Technology: Year 2000 finalized a White Paper that addressed the issue of maintaining a high quality science and engineering workforce by which to provide and support the technologies essential to our national security. I ask that each of you give your personal attention to the specific initiatives the White Paper contains.

The Assistant Secretary of Defense for Force Management and Personnel (ASD/FM&P) is available to assist you in implementing the recommended actions called for in the White Paper. Most of you have completed response to a joint tasking from the Director, Defense Research and Engineering and FM&P regarding science and engineering education programs. I thank you for your cooperation in this effort of evaluating our current programs and plans for the future.

DICK CHENEY.

[Whereupon the hearing adjourned at 3:26 p.m.]

# DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1991

MONDAY, MAY 14, 1990

U.S. SENATE,
SUBCOMMITTEE ON DEFENSE INDUSTRY AND TECHNOLOGY,
COMMITTEE ON ARMED SERVICES,
*Washington, DC.*

## IMPLEMENTATION OF THE DEFENSE MANAGEMENT REPORT, S. 2171; AND THE DEFENSE MANAGEMENT IMPROVEMENT ACT, S. 2440

The subcommittee met, pursuant to notice, at 2 p.m., in room SR-232A, Russell Senate Office Building, Senator Jeff Bingaman (chairman of the subcommittee) presiding.

Committee members present: Senators Bingaman and Wallop.

Committee staff members present: Andrew S. Effron, general counsel and Geary T. Burton, counsel.

Minority staff members present: Jonathan L. Etherton and Ronald P. Kelly, professional staff members.

Staff assistant present: Melissa Ann Ramsey.

Committee members' assistants present: John Gerhart, assistant to Senator Bingaman; Kenneth N. Luongo, assistant to Senator Levin; Melvin G. Dubee, assistant to Senator Byrd; Charles G. Pearcy, assistant to Senator Lott; and Eric H. Thoemmes, assistant to Senator Coats.

### STATEMENT OF SENATOR JEFF BINGAMAN, CHAIRMAN

Senator BINGAMAN. The subcommittee will come to order. We meet this afternoon to continue the hearings on Secretary Cheney's Defense Management Report and the administration's legislative proposal which is contained in S. 2400, the Defense Management Improvement Act. On April 24 our subcommittee had its first hearing on this proposal and at that hearing Deputy Secretary of Defense Atwood testified that congressional action on the proposal could help to improve defense management and will give the administration or the Department a better ability to manage programs and personnel.

The subcommittee intends to give a full and fair consideration to the proposals in S. 2440, some of which could produce major changes in the defense acquisition system.

At the April 24 hearing, I believe there was a general consensus among the members that the Department needed to provide us with appropriate background and supporting materials and we con-

tinue to look forward to the Department's responses to our prehearing request for information and to our questions submitted after that hearing.

In the meantime, we will continue our efforts to develop an appropriate legislative record on these proposals. Today we will receive testimony from two panels that are very knowledgeable in the field of acquisition policy.

The first panel will consist of Mr. Paul Math who is the Associate Director of the National Security and International Affairs Division of the General Accounting Office; Mr. Steve Trodden who is the Assistant Inspector General, Department of Defense, for Auditing; and Mr. Robert Lieberman who is the Assistant Inspector General, Department of Defense, for Analysis and Followup.

Mr. Don Gavin who is the Chairman of the Public Contract Law Section of the American Bar Association will testify on the second panel. We are very pleased to have all of you here and to hear your comments on S. 2440, proposed reforms in the defense acquisition system.

I would also like to make one other announcement before deferring to Senator Wallop for his comments, and that is that our subcommittee will have a further hearing on this Defense Management Report again on Thursday morning, June 7. This will be an opportunity for public witnesses to present their views either in person or through statements for the record. Individuals or organizations interested in presenting their views need to contact our subcommittee staff as quickly as possible.

Senator Wallop, do you have a statement that you would like to give at this time?

Senator WALLOP. Mr. Chairman, I would like to put the whole statement in the record, but just observe that the proposal in the Defense Management Improvement Act has the potential for fundamentally altering the acquisition environment in DOD. And in particular, section 202, dealing with commercial product acquisition and section 217, major systems acquisition would require us to allow a significant departure from acquisition policies imposed by the Congress in recent years.

My plea here is that we answer the basic question as to whether we can develop a consensus on the DOD proposal. If we chose not to pursue those, that we will still be left with the urgent need to unburden the current system. It is a process that is groaning under a stifling burden of self-imposed, congressionally-imposed, and otherwise inherited regulation, reporting and oversight. So, basically, it is not enough to have criticism. We hope to find in these hearings some help in arriving at strategies to do just that. I ask that the whole statement be put into the record.

Senator BINGAMAN. Okay. We will be glad to do that.

[The prepared statement of Senator Wallop follows:]

PREPARED STATEMENT BY SENATOR MALCOLM WALLOP

Mr. Chairman, I am pleased that our subcommittee is continuing the series of hearings on S. 2440, the Defense Management Improvement Act of 1990. Our witnesses today represent organizations whose activities can shed a great deal of light on the policy issues we must address over the next 2 months.

In the context of the Defense Management Review report, the Department of Defense has sent us a package of proposed legislation to assist them in streamlining

the management of the defense acquisition process. This proposal, the Defense Management Improvement Act of 1990, has the potential for fundamentally altering the acquisition environment in the Department of Defense. In particular, section 202 dealing with commercial product acquisition and section 217 concerning major systems acquisition would require us to allow significant departures from acquisition policies imposed by Congress in recent years.

Whether we can develop a consensus on the DOD proposals is an important question. If we choose not to pursue them, however, we will still be left with the urgent need to unburden the current system. From the Packard Commission study to the Defense Management Review report, we have been presented with the picture of a process groaning under a stifling burden of regulation, reporting and oversight.

A critical analysis of the DOD proposals is essential if we are to act in a responsible manner. But given the general imperative this subcommittee faces, mere criticism is not enough. We need strategies for resolving the complex policy issues raised by the DOD proposals in the short time available before markup. If we cannot reach consensus on proceeding with the DOD proposals, then alternatives must be presented and explored.

Mr. Chairman, today's witnesses should all be able to assist us in those tasks.

Senator BINGAMAN. Now, why don't we start with Mr. Math. I gather you are going to present the General Accounting Office's views on S. 2440 and also summarize the

**STATEMENT OF MR. PAUL F. MATH, ASSOCIATE DIRECTOR, NATIONAL SECURITY AND INTERNATIONAL AFFAIRS DIVISION, GENERAL ACCOUNTING OFFICE**

Mr. MATH. Thank you very much. We appreciate the opportunity to comment on DOD's proposed Defense Management Improvement Program.

My statement today focuses primarily on Title II of the Act. I will also, as you mentioned, discuss the elements we believe are essential for an effective acquisition process.

Over the past 20 years numerous studies have identified problems in the way DOD acquires its weapons systems and other goods and services. In summary, delivering capable and supportable weapons to the user when and where they are needed and at reasonable cost has been the exception in defense acquisition rather than the rule. The unprecedented peacetime buildup of defense during the past decade coupled with disclosures of procurement scandals and revelations of other fraud, waste, and abuse has magnified the problems with the acquisition system.

Everyone, DOD, Congress, and industry agrees that improvements are needed. In light of Federal budget deficit pressures, the rapidly changing threat environment, and the taxpayers' loss of confidence in the defense acquisition process, it is imperative that real and effective improvements be achieved. The recent Defense Management Report (DMR) is the latest attempt to resolve defense acquisition problems. The initiatives proposed in the DMR are commendable, in that they offer opportunities to achieve significant savings. In fact, we have recommended cost-saving measures in many of the same areas, including consolidating depots and maintenance facilities, centralizing payroll functions, reducing supply system costs, establishing realistic spares requirements, streamlining the acquisition process, and improving the professionalism of the acquisition workforce. Achieving savings in these areas will require sustained effort on the part of the DOD management over several years.

Before commenting on the specific proposals included in Title II, I would like to discuss the elements we believe are essential to bring about meaningful improvements. As you mentioned, Mr. Chairman, today we are releasing our report requested by Senator Nunn, which discusses seven key elements we believe are necessary for an effective acquisition process. If substantive improvements are going to be made in defense acquisition, we believe there must be strong, sustained leadership by the Secretary of Defense, a highly-qualified technically-competent acquisition workforce operating together as a team, a mirrored organizational structure between the Office of the Secretary of Defense and the military services, a free-flow of current and objective information both up and down the organization, compliance with effective internal control systems, a requirements determination process that considers fiscal constraints right from the start, and a strong link between DOD's weapons systems decision process and its resource allocation process.

[A copy of GAO/NSIAD 90-90 will be retained in committee files.]

We are encouraged by the parallels between the areas addressed in the DMR and those GAO believes are necessary to resolve long-standing acquisition problems. However, highly publicized initiatives have come and gone without effectively addressing the tough management issues surrounding defense acquisition.

Let me now turn to Title II. Title II contains a number of proposals which among other things are intended to streamline and simplify the acquisition process, eliminate unnecessary rules and regulations, reduce the number of government auditors and inspectors in contractors' plants, and reduce costs. We support these goals but are concerned about whether specific DOD proposals will achieve these goals. We are particularly concerned about DOD's proposals for a pilot program involving six major weapons programs and the use of commercial-style procurement practices because the proposals, one, do not specifically identify which laws and regulations will be relaxed, and two, do not seem to recognize the unique nature of defense acquisition and the corresponding need for strong controls to protect the taxpayers' interests. We are also concerned because DOD has not demonstrated that existing programs and initiatives in these as well as other areas could not achieve the desired results.

In terms of the pilot program, according to DOD officials, the pilot program will allow DOD to create a regulatory environment similar to that facing most businesses in the private sector. DOD's proposal would also significantly reduce government audit and inspection personnel and place more emphasis on having contractors self-administer themselves. DOD, however, has not identified which laws and regulations will be relaxed. The DOD acquisition environment is unlike that facing most businesses in the private sector. In the defense industry segments of many major contractors depend heavily upon a single customer, DOD, for its business.

There are also only a few suppliers in the defense industry capable of producing limited quantities of highly- complex and specialized one-of-a-kind products. In the private sector, prices are dictated by the marketplace; while the prices of defense items are deter-

mined through extensive negotiations, which focus on what defense items should cost.

In addition, Government procurement is designed to be fair to all potential sellers and often has concomitant social and economic goals. Because of the absence of the private sector marketplace forces, numerous laws and regulations have evolved over the years to protect the taxpayers' interest and to protect against fraud, waste, and abuse. While there has been a significant number of laws passed in recent years, the Congress enacted each to deal with a specific problem.

The unusual nature of defense acquisition demands an effective system of checks and balances to ensure the appropriate expenditure of public funds. Experience in recent years provides little comfort that existing laws and regulations should be relaxed. Spare parts horror stories and the Ill Wind procurement scandal are well known.

However, there are other equally serious problems with defense acquisition. For example, the Defense Contract Audit Agency finds that the prices in nearly one of every two negotiated contracts it reviews are inflated because contractors do not comply with the Truth In Negotiations Act. Today there is approximately $2 billion in outstanding recommendations to reduce inflated contract prices. The DOD Inspector General testified in March of this year that the efforts of the Defense Criminal Investigative Service, an organization which concentrates primarily on procurement fraud, resulted in more than 600 indictments, 500 convictions and $500 million in monetary recoveries in the past 2 years.

These facts are not encouraging. Trust and confidence in defense acquisition must be restored. However, we do not believe it can be restored through an overnight relaxation of laws and regulations and significant reduction in oversight and audit resources.

DOD's Contractor Risk Assessment Guide Program is, we believe, a better approach to restoring trust and confidence and reducing Government oversight. The program, established in 1988, is designed to encourage contractors to develop more effective internal control systems and reduce DOD oversight in areas where contractors demonstrate adequate internal control systems. We believe broader industry participation in the Contractor Risk Assessment Guide Program and other self- governing programs would go a long way towards restoring trust and confidence in defense acquisition and result in reduced oversight and audit over time.

Continuing reports of weapons systems which exceed cost estimates, or delivered late, and do not perform as intended also do not support DOD's request to relax existing laws, regulations, and oversight. DOD's track record for meeting cost schedule and performance goals is no better for systems where oversight and other requirements have been reduced substantially than for those systems where oversight was not reduced.

For example, the B–1B bomber program embodied a virtually unprecedented partnership between the Congress and the Air Force. The Congress provided early and consistent support for the program. In return for this hands-off policy that avoided congressional micro-management, DOD and the Air Force promised an effective

manned penetrating bomber that would be fielded in record time and at targeted cost. As we all know that did not happen.

The same is true of the DOD "black" programs; those programs requiring special access security clearances. We cannot provide any details in this forum, however, our work has shown that, while some such programs have been subjected to less scrutiny and oversight, they nonetheless encountered many of the same, and sometimes worse, cost, schedule, and performance problems found in other defense acquisitions.

There are several initiatives underway in DOD to improve the acquisition process including efforts to streamline the acquisition structure, increase program manager's accountability and responsibility, and improve the acquisition workforce. In addition, the National Defense Authorization Act for fiscal year 1987 authorized the Defense Enterprise Program. Among other things, the legislation specified that weapons systems programs designated as Defense Enterprise programs would have a streamlined reporting chain. The program manager would have greater control over his own staff, funding would be provided for the entire period between two acquisition milestones, and the Secretary of Defense could waive any acquisition regulations not required by statute.

In passing the legislation, Congress expected the Defense Enterprise Program to serve as models from which demonstrated management improvements could be applied to all DOD acquisition programs. That expectation, however, has not been realized. The DMR acknowledges that DOD should take better advantage of this special authority than it has to date. Also in its report on the National Defense Authorization Act for fiscal years 1990 and 1991, the Senate Committee on Armed Services report describes DOD's implementation of the Defense Enterprise Program as disappointing.

We believe that the Defense Enterprise Program and other defense management report initiatives offer DOD an opportunity to address many well recognized defense acquisition problems. Again, successful resolution of those problems requires stronger DOD management emphasis and more effective implementation of existing statutory authority, not authority for another pilot program.

In terms of commercial-styled acquisition practices, DOD proposes to improve defense acquisition by placing greater reliance on commercial products and employing streamlined commercial-styled procurement procedures. We agree that DOD should buy commercial products where feasible. The fiscal year 1987 and 1990 DOD Authorization Acts contain a number of provisions which encouraged DOD to make greater use of commercial products. However, in 1989 we reported that DOD has not placed the management emphasis needed to ensure that full advantage is taken of opportunities available within the context of existing laws to procure commercially available products. We recommended that DOD expedite guidance, provide training, and collect data on the extent to which it buys commercial items.

While we support the increased use of commercial products, we are concerned about DOD's proposal. DOD contends that existing laws and regulations make it difficult to acquire commercial items in the same way as a commercial buyer. We would not be opposed to removing impediments that may be preventing DOD from

buying more commercial products. However, as in the case of the pilot program, DOD does not identify the specific laws that impede its ability to do so. DOD needs to demonstrate what is wrong with existing laws before the Congress can describe what legislative changes are needed.

One aspect of the DOD proposal is clear. Under it, a bid protest to DOD would be the sole administrative remedy available to contest the Department's contract award decisions. Just 6 years ago the Congress saw the need to strengthen the protest process by legislating GAO's role and creating a new protest venue at the General Services Board of Contract Appeals. The Congress was concerned that an effective independent forum be available for those parties who believe they have been treated unfairly in the course of a procurement.

DOD's proposal appears to move the process in the opposite direction. If DOD believes that the aspects of the existing bid protest process impedes the efficient procurement of commercial products, we should explore ways to improve that process.

Awards without discussions. Section 204 of the act would have authorized DOD to evaluate competitive proposals and award a contract without discussions to the offeror whose proposal represents the greatest benefit to the Government based upon the evaluation factors set out in the solicitation. According to DOD officials, this proposal would allow DOD to look at a contractor's quality and past performance, not just its price.

I would like to make two points about DOD's proposal. First, there is nothing in law or regulation that precludes DOD from placing more emphasis on quality and performance and less on price. In fact, the Federal Acquisition Regulation clearly recognizes that the best value may not be the lowest price.

Second, under current law an award without discussions is permitted only when it can be demonstrated clearly that acceptance of an initial proposal would result in the lowest overall cost to the Government. The lowest overall cost requirement for awarding a contract without discussion was introduced by the Competition in Contracting Act in 1984. Prior to that act, such an award need only have been at a fair and reasonable price.

However, post-Competition in Contracting Act protest decisions have applied the standard enacted by the Congress and have held that discussions must be conducted in negotiated procurements unless award is made at the lowest overall cost, considering only cost and cost-related factors. However, we would not be opposed to a change in the current lowest-overall-cost standard if there is evidence to indicate that the requirement is proving to be detrimental to the interest of the Government.

DOD believes that the requirement that multi-year contracts must have clearly demonstrable savings of at least 10 percent should be eliminated. According to DOD, the 10 percent threshold is arbitrary and that the savings of under 10 percent on multi-billion dollar programs can often be substantial. Although we are not aware of any DOD multi-year contracts which have been disapproved solely on the basis of applicable savings thresholds, we would not be opposed to DOD's proposal. Our long-standing position has been that multi-year programs should be evaluated on a

case-by-case basis using existing savings and stability criteria as a guide.

Finally, DOD proposes raising the threshold for requiring certification of cost and pricing data under the Truth in Negotiation Act from $100,000 to $500,000. The Deputy Secretary believes that raising the threshold would significantly reduce the paperwork that industry finds a major impediment to doing business with DOD. We do not support DOD's proposal to raise the threshold. The Truth in Negotiation Act is the Government's key safeguard against inflated contract prices and sole-source situations.

As I stated earlier, the Defense Contract Audit Agency finds that negotiated prices are inflated in one out of every two contracts it audits. Increasing the threshold for cost or pricing data would unnecessarily raise the Government's risk to fraud, waste, and abuse. In fiscal years 1986, 1987, and 1988 more than $17 billion in contract awards fell between this $100,000 and $500,000 threshold.

We are concerned that raising the threshold would send a signal to defense contractors that the Government is no longer interested in having lower-dollar-value, non-competitive contract estimates supported by accurate, complete, and current data.

That completes my statement, Mr. Chairman.

[The prepared statement of Mr. Math follows:]

Statement of
Paul F. Math, Director
Research, Development, Acquisition,
and Procurement Issues
National Security and International
Affairs Division

Mr. Chairman and Members of the Subcommittee:

We appreciate the opportunity to comment on the Department of Defense's (DOD's) legislative proposal entitled the "Defense Management Improvement Act." The proposal is the product of the legislative task force established by the Secretary of Defense in conjunction with the Defense Management Report. It is intended to bring about improvements in defense management, particularly in defense acquisition management.

My statement today focuses primarily on Title II of the act which contains a number of provisions designed to improve defense acquisition. I will also discuss the elements we believe are essential for an effective acquisition process.

## IMPROVEMENTS ARE NEEDED IN DEFENSE ACQUISITION

Problems with defense acquisition have been known for a long time. Over the past 20 years, numerous studies have identified problems in the way DOD acquires its weapon systems and other goods and services. Unfortunately, the problems that have plagued defense acquisition over that period--cost growth, schedule delays, and performance shortfalls--still exist today. Delivering capable and supportable weapons to the user when and where they are needed and at reasonable cost has been the exception in defense acquisition rather than the rule.

The unprecedented peacetime buildup of defense during the past decade, coupled with disclosures of procurement scandals and revelations of other fraud, waste, and abuse has magnified the problems with the acquisition system. Unfortunately, we have reached a point where the public and the Congress seriously question DOD's ability to manage its acquisition programs effectively.

Everyone--DOD, Congress, and industry--agrees that improvements are needed. The next decade will present serious challenges for DOD acquisitions. In light of federal budget deficit pressures, the rapidly changing threat environment, and the taxpayers loss of

confidence in the defense acquisition process, it is imperative that real and effective improvement be achieved.

The recent Defense Management Report is the latest attempt to resolve defense acquisition problems. The initiatives DOD proposes in its Defense Management Report are commendable in that they offer opportunities to achieve significant savings. In fact, we have recommended cost saving measures in many of the same areas addressed in the Defense Management Report--including consolidating depots and maintenance facilities, centralizing payroll functions, reducing supply system costs, establishing realistic spares requirements, streamlining the acquisition process, and improving the professionalism of the acquisition workforce. Achieving savings in these areas will require a sustained effort on the part of DOD management over several years.

Before commenting on the specific proposals included in Title II, I would like to discuss the elements we believe are essential to bring about meaningful improvements.

ELEMENTS OF AN EFFECTIVE ACQUISITION PROCESS

Today, we are releasing a report[1] which discusses seven key elements we believe are necessary for an effective acquisition process. The report was prepared at the request of Senator Nunn.

If improvements are going to be made in defense acquisition, we believe there must be

-- strong, sustained leadership by the Secretary of Defense,

-- a highly qualified, technically competent acquisition workforce operating together as a team,

-- a mirrored organization structure between the Office of the Secretary of Defense and the military services,

-- a free flow of current and objective information both up and down the organization,

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[1]Defense Acquisition: Perspectives on Key Elements for Effective Management (GAO/NSIAD-90-90, May 14, 1990).

-- compliance with an effective internal control system,

-- a requirements determinations process that considers fiscal constraints right from the start, and

-- a strong link between DOD's weapon system decision process and its resource allocation process.

We are encouraged by the parallels between the areas addressed in the Defense Management Report and those GAO believes are necessary to resolve long-standing acquisition problems. However, highly publicized initiatives have come and gone without effectively addressing the tough management issues surrounding defense acquisition.

GAO CONCERNS ABOUT LEGISLATIVE PROPOSALS

Let me now turn to Title II of the Defense Management Improvement Act. Title II contains a number of proposals which, among other things, are intended to streamline and simplify the acquisition process, eliminate unnecessary rules and regulations, reduce the number of government auditors and inspectors in contractor plants, and reduce costs.

We support these goals but are concerned about whether the specific DOD proposals will achieve the goals. We are particularly concerned about DOD's proposals for a pilot program involving six major weapon programs and the use of commercial style procurement practices because the proposals

-- do not specifically identify which laws and regulations will be relaxed, and

-- do not seem to recognize the unique nature of defense acquisition and the corresponding need for strong controls to protect the taxpayers' interests.

We are also concerned because DOD has not demonstrated that existing programs and initiatives in these as well as other areas will not achieve the desired results. Let me briefly discuss some of our concerns about the DOD proposals.

Pilot program for six major weapon systems

According to DOD officials, the pilot program will allow DOD "to create a regulatory environment similar to that facing most

businesses in the private sector." DOD's proposal would also significantly reduce government audit and inspection personnel and place more emphasis on having contractors "self-administer" themselves.

DOD, however, has not identified which laws and regulations will be relaxed. The DOD acquisition environment is unlike that facing most businesses in the private sector. In the defense industry, segments of many major contractors depend heavily on a single customer--DOD--for business. There are also only a few suppliers in the defense industry capable of producing limited quantities of highly complex and specialized, one-of-a-kind products. In the private sector, prices are dictated by the marketplace; while the prices of defense items are determined through extensive negotiations which focus on what defense items should cost. In addition, government procurement is designed to be fair to all potential sellers and often has concomitant social and economic goals.

Because of the absence of the private sector marketplace forces, numerous laws and regulations have evolved over the years to protect the taxpayers' interest and to protect against fraud, waste, and abuse. While there has been a significant number of laws passed in recent years, the Congress enacted each to deal with a specific problem.

The unusual nature of defense acquisition demands an effective system of checks and balances to ensure the appropriate expenditure of the public's funds. Experience in recent years provides little comfort that existing laws and regulations should be relaxed. Spare parts horror stories and the ILL WIND procurement scandal are well known. However, there are other equally serious problems with defense acquisition. For example, the Defense Contract Audit Agency finds that the prices in nearly one of every two negotiated contracts it reviews are inflated because contractors do not comply with the Truth in Negotiations Act. Today, there is approximately $2 billion in outstanding recommendations to reduce inflated contract prices. The DOD Inspector General testified in March of this year that the efforts of the Defense Criminal Investigative Service--an organization which concentrates primarily on procurement fraud--resulted in more than 600 indictments, 500 convictions, and $500 million in monetary recoveries in the past two years.

These facts are not encouraging. Trust and confidence in defense acquisition must be restored. However, we do not believe it can be restored through the overnight relaxation of laws and regulations and significant reductions in oversight and audit resources. DOD's Contractor Risk Assessment Guide program is, we believe, a better approach to restoring trust and confidence and reducing government oversight. The program, established in 1988, is designed to encourage contractors to develop more effective internal control systems and reduce DOD oversight in areas where contractors demonstrate adequate internal control systems.

GAO has long supported the need for effective internal control systems. Accountability for compliance with applicable procurement statutes and regulations must start with industry. The first line of defense in controlling fraud, waste, and abuse is an adequate control system that is fully supported at all levels of a company. We believe broader industry participation in the Contractor Risk Assessment Guide program and other self governance programs would go a long way toward restoring trust and confidence in defense acquisition and result in reduced oversight and audit over time.

Continued reports of weapon systems which exceed cost estimates, are delivered late, and do not perform as intended also do not support DOD's request to relax existing laws, regulations, and oversight. DOD's track record for meeting cost, schedule, and performance goals is no better for systems where oversight and other requirements have been reduced substantially than for those systems where oversight was not reduced. For example, the B-1B bomber program embodied a virtually unprecedented partnership between the Congress and the Air Force. The Congress provided early and consistent support for the program. In return for this "hands-off" policy that avoided congressional "micro-management," DOD and the Air Force promised an effective manned penetrating bomber that would be fielded in record time and at targeted cost. As we all know, that did not happen.

The same is true of DOD "black" programs--those programs requiring special access security clearances. We can not provide any details in this forum; however, our work has shown that while some such programs have been subjected to less scrutiny and oversight, they nonetheless encountered many of the same (and sometimes worse) cost, schedule, and performance problems found in other defense acquisitions.

There are several initiatives underway in DOD to improve the acquisition process--including efforts to streamline the acquisition structure, increase program managers' accountability and responsibility, and improve the acquisition workforce. In addition, the National Defense Authorization Act for Fiscal Year 1987 authorized the Defense Enterprise Program. Among other things, the legislation specified that weapon systems programs designated as Defense Enterprise Programs would have a streamlined reporting chain; the program manager would have greater control over his own staff; funding would be provided for the entire period between two acquisition milestones; and the Secretary of Defense could waive any acquisition regulations not required by statute. In passing the legislation, Congress expected the Defense Enterprise Programs to serve as models from which demonstrated management improvements could be applied to all DOD acquisition programs. That expectation, however, has not been realized.

The Defense Management Report acknowledges that DOD "should take better advantage of this special authority than it has to date." Also, in its report on the National Defense Authorization Act for Fiscal Years 1990 and 1991, the Senate Committee on Armed Services report described DOD's implementation of Defense Enterprise Programs as "disappointing."

We believe that Defense Enterprise Programs and the other Defense Management Report initiatives offer DOD an opportunity to address many well-recognized defense acquisition problems. Successful resolution of those problems requires stronger DOD management emphasis and more effective implementation of existing statutory authority, not authority for another pilot program.

Commercial style acquisition practices

DOD proposes to improve defense acquisition by placing greater reliance on commercial products and employing "streamlined commercial style procurement procedures." We agree that DOD should buy commercial products where feasible.

The fiscal year 1987 and 1990 DOD Authorization Acts contain a number of provisions which encourage DOD to make greater use of commercial products. However, in 1989, we reported[2] that DOD has

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[2]Procurement: DOD Efforts Relating to Nondevelopmental Items (GAO/NSIAD-89-51, February 7, 1989).

not placed the management emphasis needed to ensure that full advantage is taken of opportunities available within the context of existing laws to procure commercially available products. We recommended that DOD expedite guidance, provide training, and collect data on the extent to which it buys commercial items.

While we support the increased use of commercial products, we are concerned about DOD's proposal. DOD contends that existing laws and regulations make it difficult to acquire commercial items in the same way as a commercial buyer. We would not be opposed to removing impediments that may be preventing DOD from buying more commercial products. However, as in the case of the pilot program, DOD does not identify the specific laws that impede its ability to do so. DOD needs to demonstrate what is wrong with the existing laws before the Congress can decide what legislative changes are needed.

One aspect of DOD's proposal is clear. Under it, a bid protest to DOD would be the sole administrative remedy available to contest the Department's contract award decisions.

GAO has been involved in bid protests for many years. Just 6 years ago, the Congress saw the need to strengthen the protest process by legislating our role and creating a new protest venue at the General Services Board of Contract Appeals.

The Congress was concerned that an effective, independent forum be available for those parties who believed they have been treated unfairly in the course of a procurement. DOD's proposal appears to move the process in the opposite direction. If DOD believes that aspects of the existing bid protest process impedes the efficient procurement of commercial products, we should explore ways to improve that process.

Award without discussions

Section 204 of the act would authorize DOD to evaluate competitive proposals and award a contract without discussions to the offeror whose proposal represents the greatest benefit to the Government based upon the evaluation factors set out in the solicitation. According to DOD officials, this proposal would allow DOD to look at a contractor's quality and past performance, not just its price.

I would like to make two points about DOD's proposal. First, there is nothing in law or regulation that precludes DOD from placing more emphasis on quality and performance and less on price.

In fact, the Federal Acquisition Regulation clearly recognizes that the "best value" may not be the lowest price. It states:

> "While the lowest price or lowest total cost to the Government is properly the deciding factor in many source selections, in certain acquisitions the Government may select the source whose proposal offers the greatest value [underscoring added] to the Government in terms of performance and other factors. . ."

Second, under current law, an award without discussions is permitted only when it can be demonstrated clearly that acceptance of an initial proposal would result in the lowest overall cost to the government. The lowest overall cost requirement for awarding a contract without discussions was introduced by the Competition in Contracting Act of 1984. Prior to the Act, such an award need only have been at a fair and reasonable price. Our post-Competition in Contracting Act protest decisions have applied the standard enacted by the Congress and have held that discussions must be conducted in negotiated procurements unless award is made at the lowest overall cost, considering only cost and cost-related factors.

We would not be opposed to a change in the current lowest overall cost standard if there is evidence to indicate that the requirement is proving to be detrimental to the interests of the government. We are not aware, however, that such a problem exists.

I want to emphasize that we do not think the Competition in Contracting Act currently requires the Government to buy goods and services based solely on lowest cost. As we testified last year before this subcommittee, we find nothing in current law that requires agencies to buy goods and services based on the lowest cost, technically acceptable offer, without considering quality and performance. Current law allows agencies to use whatever source selection criteria they believe strike the appropriate balance between price and technical factors.

Multi-year procurement

DOD believes the requirement that multi-year contracts must have a clearly demonstrable savings of at least ten percent should be eliminated. According to DOD, the "ten percent" threshold is arbitrary and that the savings of under ten percent on a multi-billion dollar program can often be substantial.

We annually assist the appropriations committees in assessing DOD's multi-year candidates and have found that many programs are proposed by DOD--and approved by Congress--even though the savings fall below applicable savings thresholds. The Congressional Budget Office reported last year that 14 of the 35 candidates submitted by DOD in fiscal years 1986 to 1989 did not meet the savings thresholds. Nonetheless, Congress approved 9 of those 14 candidates.

Although we are not aware of any DOD multi-year contracts which have been disapproved solely on the basis of applicable savings thresholds, we would not be opposed to DOD's proposal. Our longstanding position has been that multi-year programs should be evaluated on a case-by-case basis using existing savings and stability criteria as a guide.

Certified Cost or Pricing Data Threshold

DOD proposes raising the threshold for requiring certification of cost or pricing data under the Truth in Negotiations Act from $100,000 to $500,000. The Deputy Secretary believes that raising the threshold would significantly reduce the paperwork that industry finds a major impediment to doing business with DOD.

We do not support DOD's proposal to raise the threshold. The Truth in Negotiations Act is the government's key safeguard against inflated contract prices in sole-source situations. As I stated earlier, the Defense Contract Audit Agency finds that negotiated prices are inflated in one out of every two contracts it audits.

Increasing the threshold for cost or pricing data would unnecessarily raise the government's risk to fraud, waste, and abuse. In fiscal years 1986, 1987, and 1988, more than $17 billion in contract awards fell between the $100,000 and $500,000 range. We are concerned that raising the threshold would send a signal to defense contractors that the government is no longer interested in having lower dollar value noncompetitive contract estimates supported by accurate, complete, and current data. In responding to a requirement[3] that DOD assess the impact and cost effectiveness of raising the threshold, DOD reported in July 1987 that

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[3]House Armed Services Report No. 99-718 required DOD to report on the impact and cost effectiveness of raising the threshold.

". . . there is little reason to increase the current threshold of $100,000 for the submission and certification of cost or pricing data. Maintaining this threshold encourages contractors to provide accurate, complete and current data and entitles the Government to a price reduction if the data provided by the contractor and relied upon by the contracting officer are later found to be defective."

We believe that is a more prudent position than the one proposed this year.

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Mr. Chairman, that completes my statement, I will be glad to answer any questions you, or the members, may have.

Senator BINGAMAN. Thank you very much. Before we go into questions, let me call on the other two witnesses. Mr. Lieberman.

**STATEMENT OF ROBERT J. LIEBERMAN, ASSISTANT INSPECTOR GENERAL FOR ANALYSIS AND FOLLOWUP, DEPARTMENT OF DEFENSE AND MR. STEPHEN TRODDEN, ASSISTANT INSPECTOR GENERAL FOR AUDITING, DEPARTMENT OF DEFENSE**

Mr. LIEBERMAN. Mr. Chairman, we appreciate the opportunity to appear before you this afternoon. In the interest of time, I would like to just highlight some of the more important parts of our statement and submit the full text for the record.

Senator BINGAMAN. That will be fine. We will include it in the record.

Mr. LIEBERMAN. I want to begin by stressing the strong support of the Office of the Inspector General in the Department of Defense for the basic principles underlying the Defense Management Report to the President.

We are involved to varying degrees in a wide range of DMR implementation efforts including the Acquisition Streamlining Task Force, of which Mr. Trodden is a member, other study groups, and the DOD Ethics Council. Moreover, we believe that our on-going oversight efforts can be especially useful to the Department and to the Congress in gauging the progress and impact of whatever specific reform measures are put into place.

Although our coverage of DOD acquisition matters has been far-reaching, we do not claim expertise in every aspect of the complex acquisition arena. Therefore, we are confining our remarks today to those portions of Title II to which our work since 1982 most directly pertains.

We particularly support section 201, which would remove the 10 percent savings threshold that must be met before the DOD can

enter into multi-year contracts. We agree with the Department that there is nothing compelling about the 10 percent threshold and in larger contracts savings of less than 10 percent can still be substantial and certainly well worth pursuing.

If the DOD can present credible estimates of significant savings for a multi-year contracting approach derived through thorough cost-benefit analysis, there should be no arbitrary percentage barrier to using that approach. A remaining key factor, of course, would always be whether both DOD and the Congress are willing to trade reduced future budget flexibility for procurement program stability.

Likewise, we unequivocally recommend adoption of section 203, which would rescind the commercial pricing certification requirement in 10 USC 2323. In proposing section 203, the DOD is, in fact, carrying out an agreed upon recommendation from a 1989 DOD IG audit report. The current law requires an offeror in a transaction that is other than competitive to certify that the price offered to the government for commercial spare or repair parts is not more than its lowest commercial price, or to submit a written statement justifying any higher price offered.

Our auditors found that DOD had not fully implemented the commercial pricing certification requirement. The overall objective of ensuring that the government obtains the lowest commercial price for parts procured non-competitively was being achieved, but it was not due to the commercial pricing certification requirement. Since the potential benefits of the certificate were initially overestimated and are now clearly outweighed by the time and effort needed to determine applicability, we urge your rescission of this unnecessary requirement.

Section 204 would allow contracting officers to evaluate competitive proposals and to award a contract without further discussion to an offeror whose proposal represents the best overall value to the Government based on the evaluation factors set forth in the solicitation. Recent Comptroller General decisions have interpreted the Competition in Contracting Act as allowing award without discussion only to the lowest-priced acceptable offeror.

We support the DOD proposal to expand the contracting officer's authority by allowing award without discussion when, for an example, an offeror provides a clearly superior technical proposal at a reasonable price. It should be stressed that section 204 would certainly not eliminate the use of discussion. It would merely enhance the contracting officer's discretion on when to use that approach.

There is no way that we know of to predict to what extent contracting officers would actually use the expanded discretionary authority to make awards without discussion. Nor are there any empirical data on the extent to which further discussions mandated by current law may be resulting in more favorable terms for the government. We believe, however, that DOD contracting officers are fully capable of choosing the most prudent tactic on a case-by-case basis and should be given the authority to do so.

Section 205 amends Title X of the U.S. Code and the Federal Property Administrative Services Act to exempt small purchases from certain socio-economic provisions and amends various other statutes to establish uniform thresholds for their application.

While we do not have an opinion on what the correct threshold should be, we definitely agree that uniformity would ease the DOD administrative burden.

Section 206 permits designation of an official not lower than Assistant Secretary of Defense to serve on the FAR Council. Under current law, only the Under Secretary for Acquisition could be designated to serve on the Council. That restriction is simply not practical. We agree with the DOD that representation at the Assistant Secretary level would be adequate.

We support section 207, amending Section 2438 of Title X. Currently, section 2438 assumes that dual sourcing is appropriate for most major systems and subsystems and requires detailed justification to the Congress when dual sourcing is not considered appropriate.

We believe dual sourcing can be a very good procurement strategy in many cases. However, it is not such a preferred procurement technique that a report to the Congress is warranted every time it is not used. We agree with the DOD proposal to rescind the reporting requirement and to make dual sourcing decisions on a case-by-case basis with detailed consideration of cost and other factors.

I would now like to turn to the portions of Title II related to commercial procurement practices. Section 202 of the Commercial Products Acquisition Act of 1990 requires that the Federal Acquisition Regulation be revised to prescribe commercial-style procedures for the acquisition of commercial products.

The DOD has been prodded often to buy more off-the-shelf items. In fact, the Commission on Government Procurement recommended such measures as far back as 1972. Although we are currently doing work that may shed light on why some of the previous initiatives have had only limited success, we have not completed any recent reviews of those initiatives. The General Accounting Office has done so, and we defer to their testimony on DOD's efforts to buy more non-developmental items and on the Defense Enterprise Program.

We would like to note, in passing, that the GAO reported in February 1989 that industry officials were unable to provide evidence supporting their claim that the Truth in Negotiation Act was an impediment to DOD buying of commercial products. We will further discuss that allegation later in the statement.

The potential impact of section 202 will be clear only after implementing regulations are issued. We support the basic tenet that more needs to be done to explore the potential for greatly expanding off-the-shelf procurement. We would carefully monitor the utilization of any expanded authority granted to DOD acquisition officials under this type of legislation.

I would like to comment next on Section 208 and begin by reiterating a couple of basic points about the Truth in Negotiation Act. Public Law 87-653 was enacted in 1962 to place the government negotiator on an equal footing with the contract at negotiations in non-competitive situations. The intent of the legislation was to give the government informational parity so that excessive contract prices could be avoided.

Because price competition among defense contractors is limited in many cases, the negotiation of the contract price in many pro-

curements must be based on contractor cost and pricing estimates. Without disclosure of the basis for those estimates, the contractor usually would have a definite advantage over the government, because the government has very limited means of knowing independently whether the contractor estimates are reasonable or inflated. By ensuring full disclosure of cost or pricing data, the act places the government procurement officials on equal footing with the contractors, with equal knowledge of all facts affecting contract price. The Truth in Negotiation Act requires contractors to certify that cost or pricing data submitted at the time of agreement on price are accurate, complete, and current. Exceptions to submitting certified data are granted where there is: (1) adequate price competition; (2) established catalog or market prices of commercial items sold in substantial quantities to the public; or (3) prices set by law or regulation. Defective pricing occurs when more accurate, complete, or current cost or pricing data exist, but are not disclosed to the government.

Certificates were required in negotiated contracts and subcontracts exceeding $100,000 until Congress raised the threshold to $500,000 in December 1981. A combination of concern over excessive prices being paid for spare parts and the high incidence of defective pricing findings by auditors prompted the Congress to rescind the threshold increase in 1985.

We supported the return of the threshold for mandatory submission of cost or pricing data to $100,000 based on the continued risk of defective pricing in contracts of $500,000 or less. In 1987 our auditors found a higher incidence of defective pricing, an alarming 50 percent, in high risk contracts between $100,000 and $500,000 than in any other contract value range.

We understand that the DCAA continues to encounter defective pricing in that value range with the same frequency. This is disappointing since many contractors have been striving to improve their cost estimating systems in the past few years. In the absence of any indication that defective pricing has become less frequent, we are concerned that raising the threshold would signal a tacit acceptance by the Government of defective pricing in at least some of the approximately 25,000 contracts awarded annually in the $100,000 to $500,000 range.

We would be very interested in seeing proof that providing cost or pricing data is unduly burdensome to the contractor, who, after all, must utilize some form of cost or pricing analysis to construct a responsible price proposal.

Likewise, we know of no proof that the present threshold is an undue administrative burden for the government. Far from being a burden on the contracting officer, the certified cost or pricing data are essential for analyzing the reasonableness of the price proposal and for recovering any defectively priced amounts. Using contractor cost or pricing data, the contracting officer is the first line of defense against defective pricing.

Selective post-award audits are the second line of defense. While there are insufficient government audit resources available to review more than a small sample of certified cost or pricing data, the disclosure requirement, backed by the threat of audit and the

potential criminal sanctions against willful defective pricing, logically must have some deterrent effect against defective pricing.

For all the reasons just mentioned, we cannot support section 208 at this time. If credible data were presented, indicating that the proposed threshold was in the taxpayers' interest, we would naturally reconsider that position.

Before leaving the subject of the Truth in Negotiation Act, I might mention that it is sometimes argued that the Act is an impediment to buying off-the-shelf items. We have not seen definitive evidence supporting that contention. I repeat that under current law, bidders may already obtain waivers from the requirement to submit certified cost or pricing data, if their proposed prices are based on established catalog or market prices for commercial items sold in the marketplace.

There have been problems in administering that waiver authority, but the tendency has been to be too loose with the waivers, not too restrictive. Despite the problems encountered thus far in using the exemption authority, with additional refinement, it can serve as a good tool for facilitating more off-the-shelf procurement.

Section 217 would authorize the Secretary of Defense to waive any provision of law or regulation that the Secretary is not otherwise authorized to waive that:

— prescribes procedures for the procurement of supplies or services;

— prescribes preference to being given to any source or class of sources or mandates a particular source or class of sources;

— prescribes requirements to be imposed on the contractor that relates to the contractor's performance of the contract;

— prescribes requirements governing cost accountability, cost accounting, auditing, except the provision intended to assure financial integrity for the conduct of government programs and, except for a provision relating to the authority of the Inspector General of the Department of Defense;

— prescribing requirements for management testing evaluation or reporting on a program.

The DOD would be authorized to apply such waiver to six major acquisition programs.

We have not seen a firm indication from the DOD acquisition community of either the laws and regulations which would be waived or those which would not be waived. The second of the two exceptions set forth in section 217 is intended to avoid contravention of the Inspector General Act of 1978, insofar as oversight of the selected programs by the DOD Inspector General is concerned.

The first of the two exceptions is not as explicit. We interpret the phrase "a provision intended to ensure financial integrity for the conduct of government programs" as recognition of the need, among other things, to retain contract audit coverage of contracts associated with the six programs. Our support of the proposal is based on that assumption.

If a pilot program of this type is approved, we will assist the DOD and the Congress by closely monitoring the waiver process and calling attention to any proposed waivers that would compromise the financial integrity of the programs. We would provide ob-

jective, timely feedback to the DOD and Congress through reviews of the progress and eventual outcome of the test.

That concludes my statement, Mr. Chairman. Mr. Trodden and I would be happy to answer questions.

[The prepared statement of Mr. Lieberman and Mr. Trodden follows:]

STATEMENT BY MR. ROBERT LIEBERMAN

ASSISTANT INSPECTOR GENERAL (ANALYSIS AND FOLLOWUP)

AND

MR. STEPHEN TRODDEN, ASSISTANT INSPECTOR GENERAL (AUDITING), DOD

ON

THE DEFENSE MANAGEMENT IMPROVEMENT ACT

Mr. Chairman and Members of the Committee:

We appreciate the opportunity to appear before you this afternoon to discuss the views of the Office of the Inspector General, Department of Defense, on the Defense Management Improvement Act, S. 2440. As requested in your invitation letter, we will concentrate our comments on Title II of S. 2440. Before doing so, however, we want to stress the strong support of the Office of Inspector General for the basic principles underlying the Defense Management Report to the President and for the wide range of innovative, bold management actions being taken to implement acquisition reform. Both the previous and present DoD Inspectors General have gone on record clearly and forcefully in support of the DMR. We are involved to varying degrees in a wide range of DMR implementation efforts, including the Acquisition Streamlining Task Force, other study groups, and the DoD Ethics Council. Moreover, we believe that our ongoing and future audit, inspection, and other oversight efforts can be especially useful to the Department and the Congress in gauging the progress and impact of specific reform measures as they are put into place.

Although our coverage of DoD acquisition matters has been far-reaching, we do not claim expertise in every aspect of the complex acquisition arena. Therefore we are confining our remarks today to those portions of Title II to which our work since 1982 most directly relates.

Sections 202, 208 and 217 seem to have drawn the most controversy thus far. While we will address those Sections later in the statement, we would like to begin by stressing our support for the bulk of the proposals in Title II.

SUPPORT FOR THE DEFENSE MANAGEMENT IMPROVEMENT ACT

We particularly support Section 201, which would remove the ten percent savings threshold that must be met before the DoD can enter into multi-year contracts. We agree with the Department that there is nothing compelling about the 10 percent threshold and, in larger contracts, savings of less than ten percent can be substantial and well worth pursuing. If the DoD can present credible estimates of significant savings for a multiyear contracting approach--derived through thorough cost/benefit analysis--there should be no arbitrary savings percentage barrier to using that approach. A remaining key factor, of course, would be whether both the DoD and the Congress are willing to trade reduced future budget flexibility for procurement program stability.

We unequivocally recommend adoption of Section 203, which would rescind the commercial pricing certification requirement in 10 U.S.C. 2323. In proposing Section 203, the DoD is in fact carrying out an agreed-upon recommendation from a 1989 DoD IG audit report (No. 89-076).

The audit was conducted to determine if DoD was complying with commercial pricing certification requirements; to determine if the DoD was receiving the lowest commercial price for spare or repair parts procured noncompetitively; and to determine if the commercial pricing certification program was achieving its objectives. The current law requires an offeror, in a transaction that is other than competitive, to certify that the

price offered to the Government for commercial spare or repair parts is not more than its lowest commercial price, or to submit a written statement justifying any higher price offered.

We found that DoD activities had not fully implemented the commercial pricing certification requirement. Our work showed, however, that DoD activities generally were obtaining the lowest price for most commercial spare or repair parts, with or without the certificates. The overall objective of ensuring that the Government obtains the lowest commercial price for parts procured noncompetitively was being achieved, but it was not due to the commercial pricing certification requirement. Since the potential benefits of the certificate were initially overestimated and are now clearly outweighed by the time and effort needed to determine applicability, we recommended that the DoD propose a legislative change for relief. We urge your rescission of this unnecessary requirement.

Section 204 amends 10 U.S.C. 2305(b)(4) to allow contracting officers to evaluate competitive proposals and award a contract, without further discussion, to the offeror whose proposal represents the best overall value to the Government, based upon the evaluation factors set forth in the solicitation.

The Competition in Contracting Act permits award of a contract without discussions only if, among other requirements, it is demonstrated that award of an initial proposal would result in the lowest overall cost to the Government. Recent Comptroller General Decisions have interpreted this to mean that an award can be made without discussions only to the lowest priced acceptable offeror.

We support the DoD proposal to expand the contracting

officer's authority by allowing award without discussion when, for example, an offeror provides a clearly superior technical proposal at a reasonable price.

It should be stressed that Section 204 would certainly not eliminate the use of discussion--it would merely enhance the contracting officer's discretion on when to use that approach. There is no way to predict to what extent contracting officers would use the expanded discretionary authority to make awards without discussion. Nor are there any empirical data on the extent to which the further discussions mandated by current law may be resulting in more favorable terms for the Government. We believe, however, that DoD contracting officers are fully capable of choosing the most prudent tactic on a case by case basis and should be given the authority to do so.

Section 205 amends title 10, United States Code, and the Federal Property and Administrative Services Act to exempt small purchases from certain socio-economic provisions, and amends various other statutes to establish uniform thresholds for their application at the small purchase threshold.

While we do not have an opinion on what the correct threshold should be, we definitely agree that uniformity would ease the administrative burden associated with these contracts.

Section 206 amends section 25 of the Office of Federal Procurement Policy Act, as amended by P.L. 100-679 (41 U.S.C. 421), to permit designation of a DoD official at an organizational level not lower than an Assistant Secretary of Defense (within the Office of the Under Secretary of Defense for Acquisition) to serve on and attend meetings of the Federal Acquisition Regulatory Council. Under current law, only the

USD(A) may be designated by the Secretary of Defense to serve on the FAR Council. That restriction is not practical. We agree with the DoD assertion that representation at the Assistant Secretary of Defense level is adequate.

Section 207 amends 10 U.S.C. 2438 to require that a cost benefit analysis be performed to determine whether dual sourcing for major programs and subsystems would be an advantageous procurement strategy. Currently, section 2438 assumes that dual sourcing is appropriate for most major systems and subsystems and requires detailed justification to the Congress when dual sourcing is not considered appropriate.

We believe dual-sourcing can be a very good procurement strategy in many cases. However, it is not such a preferred procurement technique that a report to the Congress is warranted when it is not used. We agree with the DoD proposal to rescind the reporting requirement and to make dual sourcing decisions on a case by case basis, with detailed consideration of cost and other factors.

Parenthetically, we would like to mention that the dual sourcing technique does not automatically ensure full competition. Our audit of "Dual-Source Procurement Techniques" (88-163) issued June 7, 1988, showed that adequate price competition did not exist for many dual-sourced procurements, yet the requirement for certified cost or pricing data was being routinely waived. We found that usually one contractor had a decided competitive advantage over the other, and that both contractors usually knew before they made their offers that they would split the contract award. Those kinds of factors definitely limited competition and placed the Government at risk of not obtaining a fair and reasonable price. We reviewed 38

dual-sourced procurements and concluded that adequate price competition did not exist for 30 of the procurements valued at $8.8 billion. Tne DoD revised the guidance defining adequate competition; however, we believe there is still a mindset in some DoD offices that contracting officers should assume that adequate competition exists and therefore not require certified data in any dual source situation.

COMMERCIAL STYLE ACQUISITION PRACTICES

We now turn to perhaps the more controversial portions of Title II. Section 202, the "Commercial Products Acquisition Act of 1990," requires that the Federal Acquisition Regulation be revised to prescribe "commercial-style procedures for the acquisition of commercial products." Such products are defined as items that are:

-- competitively available and sold in significant quantities in the commercial market; and

-- required in the same form they are available in the commercial market or with only minor modification that does not alter their essential performance or functional characteristics. Contracts for commercial products may include those incidental services that are normally provided with sales of such products in the commercial market.

"Commercial-style procedures" are described at length in Subsection (d) of the proposed Commercial Products Acquisition Act.

As you well know, Mr. Chairman, the Congress has been prodding the DoD for several years to buy more off-the-shelf items. In fact, the Commission on Government Procurement

recommended such measures in 1972. Although we are currently conducting inspections that may shed light on why some of the previous initiatives have had limited success, we have not completed any recent reviews of the problems encountered in those initiatives. The General Accounting Office has done so, however, and we defer to their testimony on DoD efforts to stress nondevelopmental items (NDI) and on the Defense Enterprise Program. We would like to note, however, that the GAO reported in February 1989 that industry officials were unable to provide evidence supporting their claim that the Truth in Negotiation Act was an impediment to expansion of NDI procurement. We will further discuss that allegation later in this statement.

Mr. Chairman, the potential impact of Section 202 will be clear only after the implementing regulations are issued. We support the basic tenet that more needs to be done to explore the potential for greatly expanding NDI procurement. We would carefully monitor the utilization of any expanded authority granted to DoD acquisition officials under this type of legislation.

BACKGROUND ON THE TRUTH IN NEGOTIATIONS ACT

Public Law 87-653, the Truth in Negotiations Act, was enacted in 1962 to place the Government negotiator on equal footing with the contractor at negotiations in non-competitive situations. The intent of the legislation was to give the Government informational parity with contractors and subcontractors during price negotiations so that the Government could avoid excessive prices. Because price competition among Defense contractors is limited in many procurements, the negotiation of the contract price in noncompetitive procurements must be based on contractor cost and price estimates. Without

disclosure of the basis of the estimates, the contractor usually would have a profound advantage over the Government in those situations, because the Government has very limited means of knowing independently whether the contractor estimates are reasonable or inflated. By ensuring full disclosure of cost or pricing data, the Act places the Government procurement officials on equal footing with the contractors, with equal knowledge of all facts affecting contract price.

The Truth in Negotiations Act requires contractors to certify that the cost or pricing data submitted at the time of agreement on price are accurate, complete, and current. Exemptions to certifying are limited to situations where there is (1) adequate price competition, (2) established catalog or market prices of commercial items sold in substantial quantities to the general public, or (3) prices set by law or regulation. "Defective pricing" occurs when more accurate, complete, or current cost or pricing data exist, but are not disclosed to the Government. Post contract award audits of the validity of the certified cost or pricing data provided by contractors pursuant to the Act are called defective pricing reviews.

Certificates were required on negotiated contracts and subcontracts exceeding $100,000 until Public Law 97-86 raised the threshold to $500,000, effective December 1, 1981. In the ensuing years, a combination of concern over excessive prices being paid for spare parts and the high incidence of defective pricing findings by auditors prompted the Congress to rescind the threshold increase. Public Law 98-369, effective April 1, 1985, returned the threshold to $100,000. The Congress made further technical improvements to the Act in 1986, 1987, 1988 and 1989.

CHANGING THE THRESHOLD FOR COST OR PRICING DATA

Mr. Chairman, the Office of the DoD Inspector General supported the return of the threshold for mandatory submission of cost or pricing data to $100,000 based on the high incidence of defective pricing found in contracts of $500,000 or less. In 1987, our auditors found a higher incidence of defective pricing--an alarming 50 percent--in contracts between $100,000 and $500,000 than in any other contract value range. We understand that the DCAA continues to encounter defective pricing in that value range with the same frequency. This is disappointing, since many contractors have been striving to improve their cost estimating systems in the past few years. In the absence of any indication that defective pricing has become less frequent, we are concerned that raising the threshold would signal a tacit acceptance by the Government of defective pricing in approximately 25,000 contracts annually.

We would be very interested in seeing proof that providing cost or pricing data is unduly burdensome to the contractor, who after all must utilize some form of cost or pricing analysis to construct a responsible price proposal. Likewise, we know of no proof that the present threshold is an undue administrative burden for the Government. Far from being a burden on the contracting officer, the certified cost or pricing data are essential for analyzing the reasonableness of the price proposal and for recovering any defectively priced amounts.

Using contractor cost or pricing data, the contracting officer is the first line of defense against defective pricing. Selective post-award audits are the second line of defense. While there are insufficient Government audit resources to review more than a small sample of certified cost or pricing data, the

threat of audit and the potential criminal sanctions against willful defective pricing logically must have a certain deterrent effect against defective pricing.

For all of the reasons just mentioned, the Office of the Inspector General cannot support Section 208 of Title II at this time. If credible, empirical data were presented to indicate that the proposed threshold increase was in the taxpayer's interest, we would naturally reconsider that position.

EXEMPTIONS BASED ON CATALOG OR MARKET PRICES

Mr. Chairman, it is sometimes argued that the Truth in Negotiation Act is an impediment to buying off-the-shelf items. We have not seen definitive evidence supporting that contention. Under current law, bidders already may obtain exemptions from the requirement to submit certified cost or pricing data if their proposed prices are based on established catalog or market prices for commercial items sold in substantial quantities to the general public. There have been problems in administering that waiver authority. In 1987, our auditors found (Report No. 87-210) that contracting officers routinely accepted contractor claims for exemption from submitting certified cost or pricing data without adequate verification of the reported commercial sales data and catalog or market prices. The auditors reviewed 83 claims for exemption based on catalog pricing that were granted by contracting officers. Thirty-five of those (42 percent) failed to meet the Federal Acquisition Regulation exemption criteria. Current contract remedies for this situation are limited to requests to the contractor for voluntary adjustments.

We made four recommendations to the Under Secretary of

Defense for Acquisition for changes to the Federal Acquisition Regulation and the DoD Supplement to the FAR. Those recommendations were intended to establish contractor accountability and a remedy for overcharges in situations where claims for exemption are improperly granted, and to require audits, in certain circumstances, for contracts involving claims for exemption. Meanwhile, the Congress also directed that the current definition of "commerciality" be expanded to enable more exemptions. The changes have not been made as yet.

Other recommendations from our report have been implemented and have resulted in obtaining certified cost or pricing data for contracts that did not previously contain certifications; audit requests on submitted claims for waiver; and voluntary refunds of over $500,000.

Despite the problems encountered thus far in using the exemption authority, with additional refinement it can serve as a good tool for facilitating more off-the-shelf procurement.

PILOT PROGRAM FOR MAJOR DEFENSE ACQUISITION PROGRAMS

Section 217 adds a new provision to Chapter 137 of title 10, United States Code, "to conduct a pilot program in accordance with standard, commercial, industrial practices." The Secretary of Defense would have the authority to waive "any provision of law or regulation that the Secretary is not otherwise authorized to waive" that:

-- prescribes procedures for the procurement of supplies or services;

-- prescribes preference to be given to any source or class of sources or mandates a particular source or class of sources;

-- prescribes requirements to be imposed on the contractor that relate to the contractor's performance of the contract;

-- prescribes requirements governing cost allowability, cost accounting, or auditing, except a provision intended to assure financial integrity for the conduct of government programs and except a provision relating to the authority of the Inspector General of the Department of Defense; and law which is not equally applicable to contracts to which the United States Government is not a party; or

-- prescribes requirements for the management, testing, evaluation of, or reporting on, a program.

The DoD would be authorized to apply such waivers to six major acquisition programs.

We have not seen a listing from the DoD acquisition community of either the laws and regulations which would be waived or those which would not be waived. The second of the two exceptions set forth in Section 217 is intended to avoid contravention of the Inspector General Act of 1978, as amended, insofar as oversight of the selected programs by the DoD Inspector General is concerned. The first of the two exceptions is not as explicit--we interpret the phrase "a provision intended to assure financial integrity for the conduct of government programs" as recognition of the need, among other things, to retain contract audit coverage of contracts associated with the six programs. Our support of the proposal is based on that assumption.

If a pilot program of this type is approved, we will assist the DoD and the Congress by closely monitoring the waiver process and calling attention to any proposed waivers that would

compromise the financial integrity of the programs. In addition, we would provide objective, timely feedback to the DoD and Congress through reviews of the progress and eventual outcome of the test.

CONCLUSION

Mr. Chairman, we understand that the Department is responding to numerous questions posed by the Committee to further clarify the intent and potential impact of the Defense Management Improvement Act. We know that the DoD is anxious to continue a constructive dialogue with the Congress on these matters. We in the Office of the Inspector General hope to be helpful to both the DoD and the Congress during the current dialogue and in the future implementation of the DMIA and other Defense Management Report initiatives.

That concludes our statement. Mr. Trodden and I would be happy to answer any questions.

Senator BINGAMAN. Did Mr. Trodden want to make any statement at this point or just answer questions?

Mr. TRODDEN. No thank you, Mr. Chairman. I will stand on that statement.

Senator BINGAMAN. Let me start by asking a few questions. Mr. Lieberman, I gather from your testimony that you do support the request by the Department of Defense to be able to waive all applicable laws in connection with six major acquisition programs, is that correct?

Mr. LIEBERMAN. We support the concept of a test during which DOD would be given authority to waive those laws and regulations that it truly felt to be an impediment, and which DOD felt could be waived without compromising the financial integrity or the efficiency of the programs.

Senator BINGAMAN. The part of it that makes me a little nervous, quite frankly, is that at least as proposed, there would be no limitation on their discretion in determining what to waive and what not to waive. In fact, we do not even have as yet a listing of what statutes they believe should be waived.

Mr. LIEBERMAN. Nor do we, Mr. Chairman. I guess that is the central question that has pervaded all the discussions we have seen so far on Title II. Our feeling is that the DOD would use whatever

waiver authority they were granted responsibly; there would be visibility to the process. It would be our responsibility as the Inspector General to monitor what was going on and to give feedback to the Secretary and to the Congress if we thought that authority was being misused.

I think it is inconceivable that DOD would attempt to waive everything. Obviously, any program has to have some rules under which to operate. But, they have not made public a specific list of the kinds of things that they would be looking toward to waive first.

Senator BINGAMAN. How would you envision this working? Would they, as to the six acquisition programs, would they identify a statutory or regulatory impediment, and then advise somebody that they were intending to waive it, and then go forward? Or would they just go forward and it would be up to your office to come around and identify those statutes which were not followed or adhered to?

Mr. LIEBERMAN. They have not specified what procedure they would use. We would certainly advise the Secretary that the procedures should be somewhat analogous to the procedure that the Department has now for changing internal regulations. That is, one should allow those offices with a vested interest or knowledge of the regulations to comment on what the proposal would be. Then, if there is a dispute, one should have that dispute adjudicated by a decisionmaker.

But a process has not yet been specified. If we would not be allowed to comment on the proposals in advance, then we could use our audit access to look at things after the fact; but that would be less preferable.

Senator BINGAMAN. We have had some concern here on the committee that the Defense Enterprise Program idea that was put into law has not really been utilized. What is your reaction to that? It seemed to us that we were granting some authority, at least for the waiver of internal regulations and streamlining of the process, when we dreamed that up. And it was put forward as a significant benefit to the Department of Defense. But, it does not seem to have been viewed as that or has worked out as that. What is your thought on that?

Mr. LIEBERMAN. We have not reviewed the Defense Enterprise Program as such. I would defer to GAO on that since they have done some work in that area.

Senator BINGAMAN. Mr. Math, you commented on it in your testimony here. Did you want to add anything else?

Mr. MATH. I think the Congress did provide DOD the opportunity to demonstrate that they could effectively manage individual acquisition programs under regulations that were relaxed somewhat. I think DOD should demonstrate that it can effectively manage programs under the Enterprise Program before it is allowed to start another pilot program.

The Enterprise Program included authorization for funding for an entire milestone phase or for 5 years, whichever is shorter. That is an effective and important way of addressing funding and program stability, which have been concerns for some time. So, again,

I think DOD ought to demonstrate that it can manage programs under existing pilot programs rather than starting a new one.

Senator BINGAMAN. Let me ask, Mr. Lieberman, on this commercial acquisition issue we are also being requested to approve a waiver of all laws that might be in the way of DOD going forward with acquisition of commercial products. You went through that some in your testimony. Could you just summarize again your thinking on that. Do you favor us doing that? Maybe you could just paraphrase your position again.

Mr. LIEBERMAN. Well, the situation there is analogous to the situation vis-a-vis the pilot program. That is, DOD has not defined with any specificity exactly what it would do to get into a commercial-style procurement mode. Specifically, we do not know which laws or regulations would be waived in order for them to do that. Obviously, there are some impediments to buying off-the-shelf that have nothing to do with laws and regulations; over-specification of requirements is the most glaring example. The Department can deal with that without section 202.

But section 202 is directly aimed at laws and regulations. Again, we are waiting for an indication from the Department as to what kinds of laws and regulations would be waived. We assume, again, that there would be a deregulatory process set up within the Department that would allow the Inspector General and other interested elements of the Department visibility into what was going on and an opportunity, hopefully, to comment on the specific changes as they were proposed. Certainly, we would retain audit access to audit whatever procedures are set up during their actual implementation.

Senator BINGAMAN. But now as I understand it, given those conditions, given your right to come in and audit, your right to come in and enforce the laws that you have authority to enforce, you would support this kind of blanket exemption for the DOD which would permit it to move ahead more quickly on acquisition of commercial products. Is that what I understand?

Mr. LIEBERMAN. Yes, sir. I think we would phrase it in terms of, we have no reason to believe that DOD would misuse additional authority.

Senator BINGAMAN. Senator Wallop?

Senator WALLOP. Thank you, Mr. Chairman. Mr. Math, I have to begin by expressing my disappointment at your statement. It seems clear to me that you know who your client is and that is the Congress. And as we all know, the Congress is unwilling to be critical of its own actions. This leads to some significant inconsistencies in your statement. I think not the least of which is that you have willingly answered the question of Senator Bingaman here about the Defense Enterprise Program by saying that they have not used it well, without giving us any opinion as to why they may not have and what impediments to its success may actually exist.

Now, on pages 3 and 4 of your statement, you claim to support the general goal of removing unnecessary rules and regulations, yet the tenor of your comments on Title II is that we should strengthen the use of existing rules and control rather than consider relaxing any. My question to you would be, are there any signifi-

cant rules or regulations that are candidates for relaxation in appropriate situations?

Mr. MATH. We do not see any at this time, Senator. The Authorization Act of 1990–1991 directed DOD to identify the impediments through an in-depth analysis, and to provide a plan to the Congress to resolve them. We think that DOD ought to go through that process, identify the impediments on a case-by-case basis so that we can all look at them and determine whether it is, in fact, legislation that is the problem or whether it is management in the Department of Defense that is the problem.

Senator WALLOP. So you see GAO's role as one to merely criticize the product to date and not to offer any views——

Mr. MATH. We would be happy to look at each one of the impediments DOD identifies and determine whether revision in legislation is needed.

Senator WALLOP. You seem to recognize their existence, but in some sort of indirect way through your testimony.

You have mentioned, for example, the continuing problems in weapons programs—late deliveries, cost growth, failure to meet technical performance goals. Yet you also seem to point out that such problems seem to occur independently of the application of the laws, rules and oversight governing the acquisition process. It seems to indicate, to some at least, that there is some sense in which the current rules, procedures and the oversight may not be buying us very much.

Does not this, in some way, point us in the direction of some process for weeding out those that are not adding any value to the acquisition process?

Mr. MATH. In our evaluations over the years, I would say that the problems we have identified in cost, schedule, and performance are management problems. They are not problems resulting from laws and regulations that have impeded the process. Now, if there are some laws or regulations that have impeded the process, then again, they ought to be addressed on a case-by-case basis rather than through an overnight blanket authority that relaxes everything.

Senator WALLOP. But you are satisfied that there is nothing to be changed and that it is all management inadequacy?

Mr. MATH. We have not seen anything that management could not have resolved in the Department of Defense. That is correct.

Senator WALLOP. On page 5 of your statement you observe that while "there has been a significant number of laws passed in recent years, the Congress enacted each to deal with a specific problem." I have sat here through dozens of hearings and heard witness after witness testify that one of the most serious causes of the ailments afflicting defense acquisition is Congress' habit of passing a general, burdensome law to prevent the recurrence of a small set of specific problems.

Is GAO endorsing this approach? And would not some dismantling of the legislative requirements enacted piecemeal be in the interest of the U.S. taxpayer?

Mr. MATH. We are not for dismantling any of the laws on a blanket basis. Again, what we would like to see is the individual identification of each law that is causing a problem. They were, as we

said in the testimony, they were all passed for a specific reason. Is that reason no longer valid? Are there reasons to modify that law? If there are, we all ought to take a look at them and determine what we can do to make things better. But right now we do not see where those laws are acting as an impediment to effective management.

Senator WALLOP. I would just again point out that your statement is inconsistent with that conclusion and it makes it difficult for us to gain some sort of consensus on it. There seems to be some disagreement between you, Mr. Math, and Mr. Lieberman on the issue of awards without discussions under the Competition in Contracting Act.

According to GAO's testimony, and I quote, "our post-Competition in Contracting Act protest decisions have applied to standards enacted by the Congress and have held that the discussions must be conducted in negotiated procurements unless award is made at the lowest overall cost, considering only cost and cost-related factors."

Now, IG's statement asserts, and I quote them, "recent Comptroller General decisions have interpreted this lowest overall cost to mean that an award can be made without discussions only to the lowest-price acceptable offer."

Now, there is a significant difference between the lowest overall cost which could, by my reading, include life-cycle cost factors and lowest price. What is the correct interpretation of the Comptroller General's decisions? I ask this of each of you, can awards without discussions be made on the basis of factors quantified in terms of lowest life-cycle cost as well as lowest price? I ask you first, Mr. Math, then Mr. Lieberman.

Mr. MATH. It reads overall cost and the way we state it in our testimony, lowest overall cost using cost factors. The factors you can quantify, in cost terms, are the factors that can be considered. But it is the lowest overall cost and normally that is associated with the lowest overall price.

Senator WALLOP. Mr. Lieberman?

Mr. LIEBERMAN. I do not disagree with that, Senator. I think maybe it is just a matter of the way that the statement is worded. The nub of the issue is whether the contracting officer should have the authority to award on a basis other than cost without going into further discussions.

Senator WALLOP. Mr. Chairman, my time is up, but I would just point out that there is quite a big difference between how you each have phrased that. If I were the Air Force contracting officer, I would find it alarming, notwithstanding GAO's view that the rules and regulations are clear and there is no problem with that, I would find it alarming to try to make a decision upon which my career may rest using one or the other of those statements and running the risk of the second.

Something needs to be done and I think your views are too casual about the circumstances that exist today. Thank you, Mr. Chairman.

Senator BINGAMAN. Let me ask about the Competition in Contracting Act. There are various people here in Congress who take some pride in having gotten that into law. As I understand it, the

proposal that we have from DOD is that that would be waived at the discretion of DOD where it was, in their view, appropriate to do so in order to purchase commercial products. Presumably, on these six pilot programs also, it would be waived.

I believe Mr. Math, you made clear in your testimony that you are opposed to that. Mr. Lieberman, does it cause the Inspector General any concern that we would be waiving that law or that we would be granting authority to waive that law?

Mr. LIEBERMAN. I think it would certainly cause us concern if there were not a valid reason for departing from the CICA procedures. Frankly, the question is, would it be a complete walking away from CICA, or would elements of CICA be loosened. That gets us back into the question of exactly what would the Department do with the expanded authority. Frankly, we are in no position to crystal ball hypothetical actions.

Senator BINGAMAN. We are not either. I guess that is why I am a little nervous about it. They are proposing that we give them authority to waive that law where they deem it appropriate. The whole idea of passing it in the first place was that we felt that some requirements were of benefit to the public and would help us get better quality products at a better price. I guess I am just surprised that the Inspector General feels that it would be appropriate to go ahead and leave that to the discretion of the Department.

Mr. TRODDEN. Mr. Chairman, could I leap into the middle of this one, please?

Senator BINGAMAN. Yes. Go right ahead.

Mr. TRODDEN. I would like to make a couple of comments in all candor. The problem, as I see it, is that we have the chicken-and-the-egg conundrum. That is, how do you get started? Does one have to prove with great detail the validity of an initiative before the fact or after the fact?

To question as to whether we have some concerns, the answer is clearly, yes. On the other hand, the Department has a number of initiatives ongoing which we support. We also recognize the legislative calendar and the lead time necessary to get some things done.

I think most of us, as we look at the acquisition process, would say that it is suffering. It is almost collapsing under the weight of so many detailed rules and regulations. Does that mean that every rule and regulation in there ought to be waived? My opinion would be no. There is good stuff in there. The dilemma, I think, facing all of us, is how do we separate the good stuff from the overly burdensome.

As I said, the Department has a number of initiatives going on in that area. One is an effort that is being led by Under Secretary Betti under the rubric of streamlining the acquisition process. That review, which is still in its first of three phases, is designed to take a look at the major acquisition programs and determine exactly what items or regulations or rules add value to that process and which do not.

I would suggest that the proposed legislation and that initiative can come together, in the sense that the proposed legislation calls for details within 270 days after enactment. And, the IG has concern. We assure the committee that we will spend considerable effort looking at the details—should this legislation be passed —

that are called for by the 270-day clock. We would make sure DOD separates the value-added from the non-value-added aspects. We would give this committee, or any other committee of Congress, very candid views as to whether the details are appropriate or not.

Senator BINGAMAN. How much analysis should we require before we grant authority to waive all of these laws that have accumulated over the last couple of decades?

Mr. TRODDEN. I understand, Mr. Chairman. I do not mean to be cute, but the issue of analysis is exactly the central question that I see before this committee.

Senator BINGAMAN. And, I would just as soon have some of that sorted out as to which laws are unreasonable restraint on what we are trying to get done, and which laws are, in fact, adding value to the process before we go ahead and change the law.

Mr. TRODDEN. And our dilemma, of course, coming at it from the other way, is looking at a system that does seem to be in need of some help. We have a current administration that is making the effort to role up the sleeves and take a crack at that thing. We want to support that, and we have supported it in the position we have taken in front of this committee.

On the other hand, do we support throwing out babies with bath water? The answer is, no. What I would like to see, ultimately, out of this whole process, would be the hundred pounds of paper now representing existing statutes and Federal acquisition regulations and so forth, replaced with 20, 30, 40 pages of fundamental concepts that are not up for grabs, that are not waiveable.

But we are concerned that the over-detail that may exist today may detract from the principles that are crucial. And so, we fully support the acquisition streamlining process.

Senator BINGAMAN. Just to conclude this line of questions here, before I defer to Senator Wallop, let me just read you something from Mr. Gavin's statement. He is going to testify in the next panel. He says, "We recommend," and this is speaking as part of the ABA Public Contract Law Section, he is the chair of that section, and he says, "We recommend that the Congress require more specificity in laws and regulations that would be waived before we act here." It says, "We recommend this because many provisions of Federal law are essential for the protection of the Federal Government's interest in procurement of goods and services, and should not be waived. These include such laws as the Competition and Contracting Act, which requires full and open competition for Government goods, and the Contracts Disputes Act, which establishes procedures for resolution of disputes arising out of the performance of Government contracts."

Now, I take it the Inspector General's position is, you are willing to see those two waived as well, under certain circumstances, and you are willing to give DOD authority to waive those if they can demonstrate that those circumstances prevail.

Mr. TRODDEN. Yes, sir, I think that is a correct statement, Senator. We are primarily looking at the Department's request as another request for test authority. I personally view 217 on the pilot program as a request for authority to do on a test basis, six programs. The Congress, obviously, can weigh whether that number

ought to be 6 or 10 or 2, but it is a limited test in the sense that it asks for six programs.

The supply side counterpart to that is section 202, which in my opinion, asks for similar authority for supply-type items, but the limited nature of it is not quite so clear. We would support test authority, both on the supply side and on the major acquisition side, because we want to support efforts to streamline the entire process.

Senator BINGAMAN. Senator Wallop.

Senator WALLOP. Chairman, thank you and Mr. Trodden, thank you for those answers. It just strikes me that if anything is going to work, something must be tried. I mean, despite the GAO's apparent view that no problem exists, most everyone else seems to believe that some problem does. I have a hard time coming to the conclusion that the problems that exist are because of uniformly incompetent procurement officers. I mean, somehow or other that just runs contrary to anything that I can accept. Yes?

Mr. MATH. If I could, Senator, make a clarification point. I do not think our statement, and if it does I want to make the record clear, says that the GAO does not believe that there is a problem in terms of the acquisition and procurement of items——

Senator WALLOP. On your written statement, your response to me, said that.

Mr. MATH. Well, then I would like to clarify that. We do not believe that a problem does not exist in the way DOD manages their acquisition programs. I think what we want to say, and make it clear, is that we do not believe that DOD has adequately supported the contention that the problems center on legislation or regulation, and that those problems cannot be resolved with management within the Department of Defense.

And there are some things going on right now in the Department of Defense, like a criteria for market acceptability to address specific issues. They have been working, and we have been working with them, on developing the criteria that can be used as a substitute for detail specifications. Bob mentioned earlier that specifications is one of the primary problems that needs to be addressed in terms of commercial products, and I believe Bob said that that can be done, and specifications can be addressed, in the absence of any revisions in legislation.

And that is what we are saying. We believe there ought to be a clear identification of legislation that is causing an impediment, and that those impediments should be distinguished from impediments caused by any management problems that the Department of Defense may have.

Senator WALLOP. Let me just make an observation. I cannot believe that anybody who has spent the amount of time you have, and your office has, looking at the problems that exist over there could make such a statement. Like I say, I think you have just said the same thing that you have said before. There have been commissions, there have been committees, there have been observers who, over the course of time, have identified a variety of things that are impediments. But let me use what little time I have, Mr. Lieberman, to ask you a couple of questions.

In your statement, you mentioned that the IG auditors found an alarmingly high 50 percent incident of defective pricing in the con-

tracts of $100,000 to $500,000 and that is one of the reasons why you were opposed to raising the threshold.

Now, let me just ask you, because I do not know, is 50 percent defective pricing representative for the contracts in the whole class from $100,000 to $500,000, or is that percentage a result of the fact that basically, you only reviewed the high risk contracts and contractors?

Mr. TRODDEN. Let me respond to that, Senator Wallop. I may have to amplify this for the record, but the statement that Mr. Lieberman was referring to, I believe, springs from our series of spare parts audits of a couple of years ago.

In those audits, the way I ultimately briefed the issue to then Deputy Secretary Taft, was to say that it did appear to us that the spare parts initiatives were working. We were reducing the incidents of our spare parts over-pricing, and that it looked like the higher incidence of spare parts pricing problems were concentrating more in the lesser-dollar-figured contracts.

All of the statistics upon which we made that statement, I would have to supply for the record. But the analogy that I had used to Secretary Taft was, "It looks like the dirt, if you will, the problems of sweeping up a room were more concentrated in the corner of the room, and that corner was more and more typified by small-dollar procurements." So, it was almost a good news and bad news situation.

Senator WALLOP. I guess I do not quite track that with Mr. Lieberman's statement that the highest incidence was in the 100 to 500. Is that where all the spare parts are?

Mr. TRODDEN. No, no. There are quite a few that are beyond that, Senator, and we were saying—I am using 100 to 500 as an example.

Senator WALLOP. Forgive me, but I do not really understand what you have just said versus what was in the statement. Would you mind trying to explain that?

Mr. TRODDEN. The idea that the significance of overpricing, i.e., 50 percent was more concentrated in the smaller-dollar procurements is the statement I am trying to support. We did find it very prevalent in the $100,000 to $500,000 price range, and more so there than in the higher-dollar value procurements.

Senator WALLOP. So, there would be other things, some of which are ongoing and some of which might be done by all of this that would likely improve the public's buy, if you will, in that price range without raising the threshold?

Mr. TRODDEN. I am sorry, I am not sure——

Senator WALLOP. Well, you suggested that Secretary Taft had said that you were finding real improvement there. Real improvement and 50 percent does not sound, a 50 percent incidence of——

Mr. LIEBERMAN. Can I try to clarify this? Mr. Trodden is discussing overall overcharging for spares; I am discussing only defective pricing. The main way DOD has managed successfully to drive down its overall spare parts costs was to get more competition. We are still concerned, however, about defective pricing in the many non-competitive contracts which remain, both for spares and other items.

Getting back to those defective pricing statistics, I was talking about our defective pricing reviews of only non-competitive contracts. We found there was some defective pricing in approximately half of the contracts that we sampled.

Now, I believe your comment that we probably used some analysis so that we were looking at the higher risk contractors is valid. I would like to confirm that for the record. I do not think it was a completely blind sample.

[The information follows:]

The audited pricing actions were not selected on a random basis and were not intended to represent a cross section of all DOD pricing actions where certified cost or pricing data were obtained. Neither the IG nor the DCAA conducts defective pricing reviews on a blind sample basis. The reported incidence of defective pricing is not considered to be a valid indicator of the extent of error in certified cost or pricing data at large, since the audit sample was targeted and since contracting officers do not always concur with audit findings. Nevertheless, the percentage of defective pricing vis-a-vis total contract price (14 percent) in the 1987 IG sample for contracts in the $100,000 to $500,000 range was higher than for any other cost category and the 50 percent incidence rate was alarmingly high even in a targeted sample. Our trepidation over the risk of raising the threshold for certified data would remain even if "only" 10 or 20 percent of such data were defective.

Mr. LIEBERMAN. One thing I would like to add is that, in this past year, 1989, the DCAA found virtually the same percentage of defective pricing in a targeted sample as we had found in 1987. In about half of the 157 pricing actions that they looked at, they found 83 instances of defective pricing. So, that is what we mean in our statement about the situation, being essentially the same in terms of a risk of defective pricing still existing.

Senator WALLOP. Thank you, Mr. Chairman.

Senator BINGAMAN. Let me just ask Mr. Lieberman, on the proposal which is in section 202(g), this bid protest authority that—we have a disagreement there, I guess, as well. Mr. Math, I believe, has indicated he did not favor the granting to DOD full authority or the exclusive authority to entertain a bid protest, and the elimination of GAO, and GSBCA from having this authority, and Mr. Gavin in his testimony, indicates the same thing. Could you elaborate on your thinking there?

Mr. LIEBERMAN. Mr. Chairman, to be perfectly honest, we have never done any work in that area, and we simply have no informed opinion. We know, strictly from the sidelines, that there is a lot of complaining about the cumbersomeness of the current arrangement, we really do not know what the solution would be.

Senator BINGAMAN. I will just say here, as a concluding comment, unless any of you want to comment on it, it seems to me, I do not disagree that there are serious problems in the procurement system, but I feel that there is something more of a burden on the Department to come forward and with some specificity, and at least identify statutes that they believe need to be waived in certain areas, rather than just saying, give us blanket authority to waive everything, we will come back in 270 days and tell you what we decided to waive.

I do not know. I can understand the complexity of the problems, but I do not think they are going to be any less complex 270 days from now than they are today, and it would seem to me to be appropriate that we get some agreement as to what the specific prob-

lems are before we wade in to change the law. Any of you want to comment on that?

Mr. MATH. We would wholeheartedly support that, Mr. Chairman.

Mr. TRODDEN. But we would say too, Mr. Chairman, we agree about the cogency and relevance of the questions that we are aware the committee has put before the Department. We would encourage any further dialogue once both the committee and the Inspector General have had a chance to look at the answers that are forthcoming.

Senator BINGAMAN. All right. We will be back in touch as we get those answers, then. Thank you all very much, and we will go ahead to the second panel.

Our next witness will be Mr. Donald Gavin, who is the Chairman of the Public Contract Law Section of the ABA.

Before going forward with Mr. Gavin's testimony, let me indicate that we asked him to testify representing the Public Contract Law Section, which does spend a substantial amount of time on these types of issues. Mr. Gavin is accompanied by Mr. Paul Besozzi, who is well known to this committee. We are glad to see you back here. We need your good advice. Ms. Wendy Kirby is also present. We appreciate you being here as well.

Mr. GAVIN. Mr. Tom Madden is with us as well.

Senator BINGAMAN. Tom Madden, we are pleased to have you here. Mr. Gavin, why don't you start out.

**STATEMENT OF DONALD G. GAVIN, CHAIR, PUBLIC CONTRACT LAW SECTION, AMERICAN BAR ASSOCIATION; ACCOMPANIED BY MR. PAUL C. BESOZZI, CHAIR, LEGISLATIVE COORDINATING COMMITTEE, PUBLIC CONTRACT LAW SECTION, ABA; MS. WENDY T. KIRBY, CHAIR, COMMITTEE ON COMMERCIAL PRODUCTS AND SERVICES, PUBLIC CONTRACT LAW SECTION, ABA; AND MR. THOMAS J. MADDEN, FORMER CHAIR, PUBLIC CONTRACT LAW SECTION, ABA**

Mr. GAVIN. Thank you. Mr. Chairman, I am very pleased to be here today to discuss several sections of S.2440, the Defense Management Improvement Act of 1990. The views presented today are on behalf of the Public Contract Law Section of the American Bar Association. They have not been approved by the House of Delegates or the Board of Governors of the Association, and accordingly, should not be construed as representing the position of the entire Association.

The section of Public Contract Law currently consists of roughly 4,600 members drawn from all segments of the public contracting community. We have a large number of members from the government, members from the judiciary, from industry and from private bar, and we hope, therefore, to be able to bring to the committee a view that is representative of all these elements of the community.

What I am going to do today, as set forth in my brief summary of the salient provisions of the bill, is go over a few sections of the bill, sections 202, 203, 208 and 217. I then will go on to an equally brief summary of some longer comments which I have attached to

my testimony and which I would hope and ask, to have included in the record.

Senator BINGAMAN. We will include any materials that you have in the record.

Mr. GAVIN. Thank you. Section 202 of the Bill, the Commercial Products Acquisition Act of 1990 is intended to implement the recommendations of the Defense Management Review; that the Government place greater reliance on commercial products through the development of commercial-style purchasing procedures. For discussion purposes, we have divided section 202 into four major components as follows:

202 (a) through (c), the introduction and statement of purpose;

202(d), which requires the development of regulations that set forth commercial-style procedures for acquisition of commercial products;

202 (e) and (f), which would amend the Federal Property and Administrative Service Act and the Armed Service Procurement Act, to require the use of these commercial-style procurement procedures when purchasing commercial products, and to exempt such procurements from other requirements of law;

202(g), which would authorize the Secretary of Defense to select certain components of the Department of Defense to conduct a three-year test of simplified protest procedures for procurements conducted pursuant to these new procedures.

Section 203 of the proposed legislation would repeal the commercial pricing certification requirement of 10 United States Code section 2323.

Section 208, titled Certified Cost and Pricing Data Threshold would raise the threshold certification from $100,000 to $500,000.

And finally, Section 217 would authorize the Secretary of Defense to conduct a pilot program in accordance with standard commercial industrial practices with the objective of identifying the potential for increasing the efficiency and effectiveness of the acquisition process.

Now, to summarize the position of the Public Contract Law Section, we believe the goals of section 202 are, indeed, very laudable, and support these objectives of the legislation. However, what we really have to turn our attention to is the fact that by simply removing the existing Government procurement procedures, it will not guarantee, as the chair has already noted, an advancement of these objectives, since commercial contracting is governed by procedures as well.

Therefore, we raise many questions concerning Section 202, requiring attention by Congress, and the Department of Defense. As set out in the section of Public Contract Law's detailed analysis, these questions concern the meaning of key terms used in the legislation, how proposed mechanisms such as pre-qualification and revised evaluation and award procedures could be applied.

In light of these issues, to achieve the purpose of section 202 we propose that: (A) Congress obtain more information on how the proposals will work and direct the Federal Acquisition Regulation be amended to include such detail, (B) that commercial-style procedures be tested on a more limited basis before they apply to all commercial product procurements as broadly defined in the cur-

rent proposal, (C) the agency protest procedures called for by section 202(g) for the pilot program be further strengthened, particularly in the context of the contemplated protest system that would exclude access to GAO and the GSBCA. Section 202(g) contemplates the abolition of outside, non-judicial protests while providing extraordinary discretion power for agencies to conduct acquisitions. The Public Contract Law Section does not believe that it would be in the Government's best interest to exempt DOD from GAO and GSBCA bid protests for commercial products under a 3-year pilot program.

We would note that if agency protest procedures prove to be effective and workable, protestors would find less of a need to resort to other alternatives, and likewise, there would be less dissatisfaction. For the time being, the other specified objectives of the Competition and Contracting Act of 1984 will be frustrated by this proposal to exempt commercial products under the pilot program from GAO and GSBCA bid protest.

We support the repeal of commercial pricing certification requirements of 10 U.S.C. section 2323, and believe it is also appropriate to repeal the corresponding provision in the Federal Property Administrative Service Act, which appears at 41 U.S.C. section 253(e).

Nearly 6 years after their enactment, these statutes still have not been effectively implemented through regulations, and they have generated considerable confusion without accomplishing their intended purpose.

As proposed by section 208, we would support the raising of the threshold for certified cost or pricing data from $100,000 to $500,000. There is no need for this added administrative burden on both contractors and the government. Raising the level to $500,000 would bring the Truth and Negotiation Act Certification to the same level as the Cost Accounting Standards applicability.

We are unpersuaded by the argument that there is little proof that this requirement is an administrative burden. Contracting officers involved in procurements have concluded, based on communication with commercial sellers, that this is indeed a problem. I know personally that commercial small businesses find this requirement particularly confusing and intimidating. There would still remain a myriad of laws and regulations for use in pursuing actions against fraudulent contractors. Raising the level would not affect, in any way, the existing audit authority of the Inspector General.

We support the basic purpose of section 217, to allow the Secretary of Defense to waive existing procurement laws and regulations to increase the efficiency and effectiveness of the acquisition process. The section of Public Contract Law does recommend that section 217 be modified to require the Secretary of Defense to set forth, with more specificity, the particular laws and regulations that would be waived.

In conclusion, Mr. Chairman, we understand that not all the provisions included within the Defense Management Improvement Act of 1990 would require legislation to implement. Nevertheless, several of the proposals contained in this legislation and reviewed by the Public Contract Section of the American Bar Association can only

be successfully achieved with the assistance of Congress and the passage of legislation.

In our attached comments, we provide a more detailed analysis of the above, which is hoped will be useful to the chairman and members of the subcommittee, as well as their staffs. That concludes my statement, and I would be very happy to answer questions.

[The prepared statement of Mr. Gavin follows:]

# TESTIMONY OF MR. DONALD G. GAVIN, CHAIR, PUBLIC CONTRACT LAW SECTION AMERICAN BAR ASSOCIATION ON S. 2440

Mr. Chairman and Members of the Subcommittee:

I am pleased to appear before you to discuss Sections 202, 203, 208 and 217 of S. 2440, the Defense Management Improvement Act of 1990. These views are presented on behalf of the Section of Public Contract Law of the American Bar Association. They have not been approved by the House of Delegates or the Board of Governors of the American Bar Association and, accordingly, should not be construed as representing the position of the Association.

I have set forth below a brief summary of the salient provisions of the bill on which the Public Contract Law Section has provided comments and analysis, specifically Sections 202, 203, 208 and 217. Thereafter, set forth again in summary fashion is the Public Contract Law Section's comments on these enumerated sections. Enclosed in its entirety are detailed comments on these enumerated provisions setting forth a more extensive analysis. I am happy to briefly review with the Subcommittee our summary comments and then undertake to answer questions relating to these provisions.

As proposed by the Department of Defense, the legislation seeks in part the following:

1. Section 202 of the Bill, the "Commercial Products Acquisition Act of 1990," is intended to implement the recommendations of the Defense Management Review that the Government place greater reliance on commercial products through the development of commercial-style purchasing procedures. For discussion purposes, we have divided Section 202 into four major components, as follows:

(a) Subsections 202(a)-(c), the Introduction and Statement of Purpose;

(b) Subsection 202(d), which would require the development of regulations that set forth "commercial-style procedures for acquisition of commercial products";

(c) Subsection 202(e) and (f), which would amend the Federal Property and Administrative Services Act and the Armed Services Procurement Act to require the use of these commercial-style procurement procedures when purchasing commercial products, and to exempt such procurements, with specified exemptions, from other requirements of law; and

(d) Subsection 202(g), which would authorize the Secretary of Defense to select certain components of the Department of Defense to conduct a three-year test of simplified protest procedures for procurements conducted pursuant to the new procedures.

2. Section 203 of the proposed legislation would repeal the "commercial pricing certification" requirement of 10 U.S.C. § 2323.

3. Section 208, entitled "Certified Cost and Pricing Data Threshold," would raise the threshold for certification from $100,000 to $500,000.

4. Section 217 would authorize the Secretary of Defense to "conduct a pilot program in accordance with standard commercial, industrial practices with the objective of identifying the potential for increasing the efficiency and effectiveness of the acquisition process."

**A SUMMARY OF THE PUBLIC CONTRACT LAW SECTION'S COMMENTS**

1. The goals of Section 202 are indeed laudable; we support the objectives of this legislation. However, simply removing the existing government procurement procedures

would not guarantee advancement of these objectives since commercial contracting is governed by procedures also. Therefore, we raise many questions concerning Section 202 requiring attention by Congress and the Department of Defense. As set out in the Section of Public Contract Law's detailed analysis, these questions concern the meaning of key terms used in the legislation and how proposed mechanisms, such as prequalification and revised evaluation and award procedures, could be applied. In light of these issues, to achieve the purpose of Section 202, we propose that:

(a) Congress obtain more information on how the proposals will work and direct that the Federal Acquisition Regulation be amended to include such detail;

(b) the "commercial-style" procedures be tested on a more limited basis before they are applied to "commercial products" procurement as broad by defined in the current proposal;

(c) the agency protest procedures called for by § 202(g) for the pilot program be further strengthened, particularly in the context of a contemplated protest system that would exclude access to GAO and GSBCA. Section 202(g) contemplates the abolition of outside non-judicial protests while providing extraordinary discretionary power for agencies to conduct acquisitions. The Section does not believe that it would be in the Government's best interest to exempt DOD from GAO and GSBCA's bid protests for commercial products under a three year pilot program. We would note that if agency protest procedures proved to be effective and workable, protestors would find less of a need to resort to other alternatives. For the time being, the other specific objectives of the Competition in Contracting Act of 1984 will be frustrated by this proposal to exempt commercial products under the pilot program from GAO and GSBCA bid protests.

2. We support the repeal of "commercial pricing certification" requirements of 10 U.S.C. § 2323 and believe it is also appropriate to repeal the corresponding provision in the Federal Property Administrative Services Act, which appears at 41 U.S.C. § 253(e). Nearly

six years after their enactment, these statutes still have not been effectively implemented through regulations, and they have generated considerable confusion without accomplishing their intended purpose.

3. As proposed by § 208, we would support the raising of the threshold for certified cost or pricing data from $100,000 to $500,000. There is no need for this added administrative burden on both contractors and the government. Raising the level to $500,000 would bring the Truth In Negotiation Act certification to the same level as Cost Accounting Standards applicability. We are unpersuaded by the argument that there is little proof that this requirement is an administrative burden. Contracting officers and procurement officials have concluded based on legitimate communication with commercial sellers that this is indeed a problem. I know personally that commercial small businesses find this requirement particularly confusing and intimidating. There would still remain myriad laws and regulations for use in pursuing actions against fraudulent contractors. Raising the level would not affect in any way the existing audit authority of the Inspector General.

4. We support the basic purpose of § 217 to allow the Secretary of Defense to waive existing procurement laws and regulations to increase "the efficiency and effectiveness of the acquisition process." The Section of Public Contract Law does recommend that § 217 be modified to require the Secretary of Defense to set forth, with more specificity, the particular laws and regulations that would be waived.

## CONCLUSION

Mr. Chairman, we understand that not all of the provisions included within the Defense Management Improvement Act of 1990 would require legislation to implement. Nevertheless, several of the proposals contained in this legislation reviewed by the Public Contract Law Section of the American Bar Association can only be successfully achieved with the assistance of Congress and the passage of legislation. By our attached comments, we have provided a more detailed analysis of the above which, it is hoped, will be useful to the Chairman and the Members of the Subcommittee as well as their staffs.

That concludes my statement, and I would be happy to answer questions.

# SECTION OF PUBLIC CONTRACT LAW OF THE AMERICAN BAR ASSOCIATION

## COMMENTS ON SECTIONS 202, 203, 208, 217 AND 305 OF S. 2440 DEFENSE MANAGEMENT IMPROVEMENT ACT OF 1990

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**SECTION OF PUBLIC CONTRACT LAW**
**OF THE AMERICAN BAR ASSOCIATION**

**Comments on**
**Sections 202, 203, 208, and 217 of**
**S. 2440 Defense Management Improvement Act of 1990**

These views are presented on behalf of the Section of Public Contract Law of the American Bar Association. They have not been approved by the House of Delegates or the Board of Governors of the American Bar Association and, accordingly, should not be construed as representing the position of the Association.

## A. Section 202

Section 202 of the Bill, the "Commercial Products Acquisition Act of 1990," is intended to implement the recommendations of the Defense Management Review that the government place greater reliance on commercial products through the development of commercial-styled purchasing procedures. For discussion purposes, Section 202 can be divided into four major components: (1) Subsections 202(a)-(c), the introduction and statement of purpose; (2) Subsection 202(d), which would require the development of regulations that set forth "commercial-style procedures for the acquisition of commercial products"; (3) Subsections 202(e) and (f), which would amend the Federal Property and Administrative Services Act and the Armed Services Procurement Act to require the use of these commercial-style procurement procedures when purchasing commercial products, and to exempt such procurements, with specified exceptions, from other requirements of law; and (4) Subsection 202(g), which would authorize the Secretary of Defense to select certain components of the Department of Defense to conduct a 3-year test of simplified protest procedures for procurements conducted pursuant to the new procedures. Each of these sections is discussed in turn.

### 1. Subsections 202(a)-(c): Introduction and Statement of Purpose

The stated purpose of Section 202 is "to require the development of commercial-

style purchasing procedures to be used by executive agencies to better utilize market research, avoid over-specification and otherwise facilitate the acquisition of commercial products." Section 202(c). The goal, as stated in Subsection 202(b), is to eliminate "over-specification" and other burdensome and unnecessary requirements which dissuade many sellers of commercial products from competing for government contracts. This echoes the Packard Commission's 1986 recommendation that procurement practices be made less cumbersome, and more like those used by commercial buyers and sellers, in order to attract the best suppliers to the government marketplace:

> Procurement officers must be allowed and encouraged to solicit bids through purchase descriptions that are stated as functional performance characteristics rather than through detailed design and 'how-to' specifications; to limit bids to qualified suppliers; to give preference to suppliers that have demonstrated the quality and reliability of their products; and to recognize value (quality and price) based on products' commercial acceptance in the marketplace.

A Quest for Excellence: Final Report to the President by the President's Blue Ribbon Commission on Defense Management at 63 (June 1963) ("Packard Commission Report").

The goal is a laudable one, and Section 202 attempts to address each of the elements quoted above. Moreover, Section 202 differs from previous attempts to address the question of commercial products procurement, in that it proposes changes to the system as a whole rather than to individual problems faced by the buyers and sellers of commercial products (such as the cost or pricing data requirement or the Government's policies with regard to technical data rights, two of the issues most frequently cited by commercial products contractors as "impediments" to doing business with the Government). In so doing, the bill underscores some of the fundamental differences between government and commercial procurement.

There are valid reasons for many of the differences between government and commercial procurement. As discussed in more detail below in connection with the "pilot program" proposed in Section 217 of the Bill, simply removing the existing government procurement procedures will not magically solve the problem. Commercial contracting is governed by procedures too -- including those set forth in the Uniform Commercial

Code, state and common law. Most government contracting officers, however, are unfamiliar with the Uniform Commercial Code.

We believe there is merit to the proposition that the existing procurement system was developed primarily with non-commercial products in mind, and that some changes to this system may be appropriate when purchasing commercial products. We support in principle the concept of trying to use more "commercial-style" procedures for "commercial products" contracting. Further detail is needed in order to assess the wisdom of the current proposal. Accordingly, we would recommend (1) that Congress obtain more information on how the proposal is intended to work and direct that implementing Federal Acquisition Regulations be promulgated to include such detail; and (2) that the "commercial-style" procedures be tested on a more limited basis before they are applied to all "commercial products" procurement.

### 2. Subsection 202(d): Development of "Commercial-Style" Procurement Practices

This section requires the Administrator of the Office of Federal Procurement Policy, "jointly with the Administrator of the General Services Administration, the Secretary of Defense, and the Administrator of the National Aeronautics and Space Administration," to develop regulations for incorporation into the Federal Acquisition Regulations "that set forth commercial-style procedures for the acquisition of commercial products." Implementing regulations must provide guidance regarding what should qualify as "commercial products" or what "commercial-style" procedures will consist of.

#### a. Defining a "commercial product"

The uncertainty over the definition of "commercial products" has been a recurring theme in DOD and Congressional attempts to implement the recommendations of the Packard Commission Report, and it is not an easy question to resolve. A number of (often conflicting) definitions of "commercial products," "commercial items," and "non-developmental items" already exists in statute and regulation. The current proposal offers

yet another definition without any concrete guidance regarding the appropriate standards for application.

The difficulties of establishing a single definition for "commercial products" are discussed in some detail in the Section of Public Contract Law's recently-published monograph, Contracting for Commercial Products and Services (American Bar Association 1989). As discussed in Chapter 2 of the monograph, the proliferation of definitions is due, at least in part, to the fact that the Government relies on the "commerciality" of a product for different reasons in different contexts.

For example, perhaps the best-known definition of "commerciality" is the definition incorporated in the "catalog or market price" exemption from the requirement for the submission of cost or pricing data. Under the Truth in Negotiation Act, 10 U.S.C. § 2306a, 41 U.S.C. § 254(d), offerors in certain negotiated procurements are required to submit cost or pricing data so that the contracting officer can ensure that the prices offered to the Government are fair and reasonable. The Act provides that cost or pricing data need not be submitted by offerors whose prices are "based on . . . established catalog or market prices of commercial items sold in substantial quantities to the general public." 10 U.S.C. § 2306a(b)(1)(B), 41 U.S.C. § 254(d)(5)(A)(ii). The rationale for this exemption is that a price that is set through competition in the marketplace can be deemed reasonable without resorting to a detailed analysis of the offeror's potential profit. Because the Government is relying on the existence of market forces to ensure a reasonable price, the statutory definition of commerciality should include a quantitative measure of the amounts sold in the commercial marketplace. Thus, the Federal Acquisition Regulation incorporates specific percentage tests designed to help the contracting officer determine whether a catalog-priced item has been sold in "substantial quantities" at the catalog price. FAR 15.804-3(f).

On the other hand, the Government may also rely on the "commerciality" of a product to ensure that the product is available for prompt delivery (see e.g. Federal Data Corp., GSBCA No. 9642-P, 89-1 BCA ¶ 21,369), to decrease production costs or otherwise save money (see e.g., Hughes Advanced Systems Co., GSBCA No. 9601-P,

89-1 BCA ¶ 21,276), or to ensure that it is buying a quality product and minimize the risks associated with purchasing experimental unproven equipment (see e.g., AUL Instruments, Inc., B-186319, 76-2 CPD ¶ 212). For these purposes it may not be necessary to determine whether the product has been sold in "substantial quantities to the general public," or that specified quantities have been sold at an established catalog or market price.

None of the definitions of "commercial products," however have been easy to apply. There has been considerable controversy in recent years over the application of the FAR's strict percentage tests to establish the "commerciality" of a product for purposes of the cost or pricing data exemption, particularly since their application often results to exclude modified items, components, spare parts, new or discontinued items from the cost or pricing data exemption. Indeed, in Section 824(b)(6) of the National Defense Authorization Act for Fiscal Years 1990 and 1991, Pub. L. No. 101-189, Congress specifically directed the Secretary of Defense to revise DOD's regulations in this area to alleviate some of the inequities caused by this restrictive definition. Publication of these regulations for comment is expected in May.

Reliance on a product's "commerciality" for purposes other than pricing, particularly in the area of automatic data processing equipment, has resulted in a proliferation of solicitation provisions, each containing different "definitions" of the types of commercial products to be acquired. Examples include requirements that products be "announced," "formally announced for marketing purposes," "announced publicly for marketing purposes," "commercially available," "off-the-shelf," "state-of-the-art," "regularly manufactured," or "in current production," in addition to undefined solicitation references to "commercial products" or "commercial items." These different definitions have resulted in considerable confusion, and have provided the basis for numerous protests, as described more fully in our recent monograph cited above.

The definition proposed in Subsection 202(d)(1), introduces several new concepts without any concrete guidance as to their meaning and therefore has the potential for creating more confusion. It is unclear, for example, when a product may be considered

as "sold in significant quantities in the commercial market." Section 202(d)(1)(A). Presumably, the word "significant" was chosen instead of the word "substantial," to make it clear that products would not have to meet the percentage "quantity" tests of the cost or pricing data exemption to come within this section. No guidance is given, however, (a) whether "significant" quantities are more or less than "substantial" quantities, or (b) how the standard is to be applied.

Other new terms in need of clarification include "competitively available" (§ 202(d)(1)(a)); "required in the same form as they are available in the commercial market" (§ 202(d)(1)(B)); "minor modification that does not alter their essential performance or functional characteristics" (§ 202(d)(1)(B)); "incidental services," (§ 202(d)(1)); and "market acceptance" (§ 202(d)(2)(B)). These issues must be promptly refined in the regulations to permit assessment of the impact of the proposal.

The proposal also gives the contracting officer authority to waive the requirement that a product be sold in "significant quantities" to qualify as a commercial product. The requirement can be waived if the produce "has been satisfactorily supplied under current or recent contracts for the same requirements," otherwise meets the specified criteria, and is evaluated on an equal basis with the other offered products. This potentially brings any product previously purchased by the Government into the category of "commercial products," and could result in a tremendous expansion of the number of procurements to which the "commercial-style" procedures would apply.

b. **Developing "commercial-style procedures"**

Subsection 202(d)(2) sets forth a framework for conducting procurement of "commercial products," which would apply in place of many of the existing laws governing federal contracting. Among the elements of these "commercial-style procedures" are (1) a procedure under which the contracting officer, through advance publication in the Commerce Business Daily, could "pre-qualify" offerors of commercial products and limit competition to those who had qualified (§ 202(d)(2) (A-H), (K)); (2) procedures for

evaluation and award of commercial products contracts, including a provision that award may be based on any factors the contracting officer determines are "necessary to identify the offeror that provides the greatest benefit to the agency," and confirmation that the contracting officer can make award without discussions and without the submission of best and final offers (§ 202(d)(2)(I-J)); and (3) a requirement that "commercial-style contract terms and conditions be used to the maximum extent consistent with the interests of the Government." (Section 202(d)(2)(L)).

(1) **Prequalification**

The Packard Commission noted that one of the ways in which industrial companies ensure quality control is to maintain "lists of qualified suppliers that have maintained historically high standards of product quality and reliability"; accordingly, it recommended that procurement officers be allowed to "limit bids to qualified suppliers [and] to give preference to suppliers that have demonstrated the quality and reliability of their products." A Formula for Action at 26 (April 1986).

To our knowledge, this is the first time the concept of "prequalification" has been included in a legislative proposal, and it is a concept that deserves further exploration. As the Defense Science Board has recognized, however, the concept of supplier prequalification, at least on one level, may be inconsistent with the principle established in the Competition in Contracting Act that all suppliers should have the opportunity to bid. See Use of Commercial Components in Military Equipment (Final Report of the Defense Science Board 1986 Summer Study) at 44-45 (January 1987); see also Packard Commission Report, Appendix H, at 86-91. Presumably, this concern prompted DOD to conclude it is necessary to propose legislation authorizing these procedures rather than simply to implement them.

In light of the potential conflict with this well-established Congressional policy, any step in this direction should be carefully circumscribed. The current proposal leaves many unanswered questions and gives broad discretion to the contracting officer to effectively abandon all but a few existing procurement procedures.

For example, Subsection 202(d)(2)(B) permits the contracting officer (a) to require offerors to demonstrate, "in accordance with criteria prescribed by the contracting officer," that products being offered have achieved a "suitable" level of market acceptance and that they meet "established commercial or other specified standards," and (b) to prohibit the award of a contract to any offeror who has not made the required demonstration "to the satisfaction of the contracting officer." This gives the contracting officer virtually unbridled discretion to determine which offerers qualify for inclusion in this initial "pool" of offerors, without any guidance as to what the criteria should be. Once the pool is established, the contracting officer would be free to "rotate" among the sources on the list if the number of sources was considered "extensive." Neither term ("pool" or "extensive") is explained. In light of the uncertainty surrounding this issue, Congress may wish to proceed first on a test basis, applying some version of these "commercial practices" to a more limited universe of "commercial products."

(2) **Evaluation and award procedures**

Subsection 202(d)(2)(I) states that the regulations must require that evaluation of offers and selection for contract award "be based solely on the factors specified in the solicitation," including "price and any other factors which the contracting officer determines are necessary to identify the offer that provides the greatest benefit to the agency." This is consistent with existing law governing competitive proposals (or "negotiated" procurements), as set forth in the Competition in Contracting Act. Under existing law, agencies are required to evaluate both sealed bids and competitive proposals "based solely on the factors specified in the solicitation." 41 U.S.C. § 235b(a), 10 U.S.C. § 2305(b)(1). While awards in sealed-bid situations must be made "considering only price and other price-related factors" (41 U.S.C. § 235b(c), 10 U.S.C. § 2305(b)(3)), awards in negotiated procurement are to be made to the offeror whose proposal is "most advantageous to the United States, considering only price and the other factors included in the solicitation." 41 U.S.C. § 235b(d)(2), 10 U.S.C. § 2305(b)(4)(D). These additional factors need not be price-related.

The current proposal goes on to state that "the past performance of products and sources may be among those factors." Section 202(d)(2)(I). This is not necessarily inconsistent with existing law. For example, solicitation requirements have been upheld that require contractors to provide evidence of performance history. See e.g., Dresser Industries, Inc., B-228324, 87-2 CPD ¶ 634; Morton Management, Inc., B-224031, 87-1 CPD ¶ 32; Electronic Systems, USA, B-224472, 86-2 CPD ¶ 410. In addition, as noted in the Defense Management Review report, DOD already has several efforts underway, such as those in the Air Force and DLA, designed to assess contractor performance for use in future contract award decisions.

Finally, Subsection 202(d)(2)(J) states that the regulations may "authorize the award of a contract without discussions or a request for best and final offers." This is possible under existing law as well. Under existing law, however, a contracting officer may only make such an award if it would result in the "lowest overall cost" to the Government. 41 U.S.C. § 253b(d)(1))(B), 10 U.S.C. § 2305(b)(4)(A)(ii). Standing alone, the proposed change has some merit, provided that mechanisms will continue to exist to ensure that this discretion is exercised in a reasonable manner.

The present statutory scheme requires discussions be conducted to the maximum extent possible with all offerors in the competitive range. FAR requires that for award without discussions to be made, the solicitation clearly must state the government's option to award without discussions and that the proposal meet the solicitation requirement exactly, so as to avoid changing evaluation criteria for all offerors. FAR 15.610. To the extent that the proposed provision would tend to limit competition and unreasonably favor incumbent contractors, we have serious reservations.

Technical discussions in negotiation of today's technically advanced procurements are frequently the only tool by which the contracting office can assure the responsiveness and responsibility of its offerors. In many instances, such discussions are vital to permit contracting agencies to determine the scope of a procurement.

We are concerned to the extent that an increase in the number of awards without discussions would in effect harm the competitive system by reducing competition and

lead the competitive process into an auction atmosphere.

(3) **Use of "commercial-style" contract terms and conditions**

Subsection 202(d)(2)(L) states that regulations should be developed that "require the use of commercial-style contract terms and conditions to the maximum extent consistent with the interests of the Government." While the simplification of government contract terms is a worthy goal, this provision is unlikely to have any practical effect unless contracting officers are given more concrete guidance in the regulations regarding what these "commercial-style contract terms and conditions" should be. This issue is already being addressed as a result of Congress' direction, in Section 824 of the National Defense Authorization Act for Fiscal Years 1990 and 1991 (Pub. L. No. 101-189), that DOD develop a simplified uniform contract for the acquisition of commercial items, which should include only (1) contract clauses required to implement provisions of law applicable to such an acquisition, and (2) those contract clauses that are determined by the Secretary of Defense to be appropriate for such a contract. DOD's simplified contract, and the accompanying regulations, are also due to be published for public comment this May.

3. **Subsections 202(e)-(f): Amendments to Existing Procurement Statutes**

Subsections 202(e) and (f) prescribe amendments to the Federal Property and Administrative Services Act and the Armed Services Procurement Act to require contracting officers to use the "commercial-style procedures" (i.e., the procedures established in the regulations to be promulgated pursuant to § 202(d)) to procure commercial products (as defined in § 202(d) and repeated in §§ 202(e) and (f)) unless the contracting officer purchases them under simplified small purchase or multiple award schedule procedures or determines and documents that another authorized method of acquisition is more appropriate."

These sections go on to state, however, that purchases of "commercial products" made pursuant to either the commercial-style procedures established pursuant to

§ 202(d) or simplified small purchase or multiple award schedule procedures shall be exempt, with certain exceptions, from "any other requirement of law" that prescribes terms and conditions for inclusion in contracts. Section 202(d) also (a) prescribes preferences to be given to any source or class of sources, (b) mandates a particular source or class or sources, and (c) prescribes requirements that relate to contractors' performance.

With the exception of the few "socioeconomic" provisions that are preserved through Subsection 202(e), this exemption is virtually open-ended. This exemption could result in waiving of laws that the drafters did not intend to waive. For example, most laws imposing ethical obligations on government contractors arguably "prescribe terms and conditions to be included in contracts". We suggest there is a need for enumeration of any provisions deemed inapplicable.

Second, if simplified small purchases and multiple award schedule procurements are not subject to the "commercial practices" established pursuant to Subsection (d), it does not seem logical that they would then be exempt from the other "requirements of law" referenced in Subsection 202(e). In effect, this would mean that these procurements could be left without any governing law or procedures.

Third, it is unclear what is meant by the phrase "which requirements of law are not equally applicable to contracts to which the United States Government is not a party."

The portion of Subsection 202(e) that amends the Federal Property and Administrative Services Act contains an additional section stating that, for civilian agency procurement, no exemption is authorized from "the requirements of section 304(d) of this title (the cost or pricing data requirement) or any policies or procedures established by the Administrator with respect to the negotiation and award of Multiple Award Schedule Contracts." No similar language with regard to the Truth in Negotiation Act's cost or pricing data requirements appears in Subsection 202(f), which contains the corresponding amendments to the Armed Services Procurement Act. It is unclear what is intended by this section, or why a similar section is not included for defense procurement. We would note, however, that pricing issues are among those most frequently cited by commercial products contractors in concluding that doing business with the government is not worth

the trouble.

4. **Subsection 202(g): Intra-Agency Protest Process**

Subsection 202(g) "Commercial Style Acquisition Practices," which contemplates the abolition of outside non-judicial protests while providing extraordinary discretionary power for agencies to conduct acquisitions, raises issues of concern. The same concern is warranted in connection with Section 217, "Pilot Program for Major Defense Acquisition Programs." The Bill would effectively neutralize the Competition in Contracting Act for affected programs. Such a step may not be in the Government's best interests, nor is it necessary to achieve the stated objectives of the legislation.

We agree that elimination of unnecessarily restrictive specifications and reduction in procurement paperwork will enhance competition, reduce prices to the Government, and speed up acquisitions. However, elimination of restrictive specifications does not require legislation. It does not even require new regulations. Current law already requires that agencies solicit only for their actual minimum needs. Unfortunately, unnecessarily restrictive specifications too often result from agencies expressing their preferences rather than their actual needs in developing specifications. A large number of bid protests each year are concerned with specifications which allegedly were prepared to ensure that certain sources of supply are used or others excluded without regard to actual needs.

Although Section 202 of the Bill contemplates the establishment of commercial-style procurement procedures for all agencies, Section 202(g) would exempt DOD alone from GAO and GSBCA bid protests for commercial products under a three year pilot program. We do not believe this would be in the Government's best interests.

There is no necessary or logical connection between using simplified procurement procedures and eliminating the availability of outside protest remedies. The protest forum would simply apply such laws and regulations which are applicable to the new procedures. To the extent, for example, that the Bill would permit greater discretion on the part of procuring agencies to determine their requirements and select contractors, currently available bid protest forums would determine whether that discretion had been

abused or whether any provisions of applicable law had been violated.

The absence of bid protest forums in the commercial world is beside the point. What is relevant here is that federal agencies answer to the taxpayers for expenditures of public funds. The oversight and "management by exception" of GAO and the GSBCA are necessary to insure proper expenditures of appropriated funds. Otherwise, the federal courts could be deluged with new protest cases. Resolution of protests in the courts is at least as burdensome and disruptive of agency procurements as protests at GAO and GSBCA.

The agency protest procedures called for by Section 202(g) for the pilot program appear insufficient, particularly in the context of a protest system which excludes GAO and GSBCA. The Public Contract Law Section of the ABA has, since the enactment of CICA, conducted studies and made recommendations for improvement of the protest process at the agency level, at GAO and at GSBCA. Among these recommendations, we urged that FAR provide minimum procedures for agency protests which would include decisionmaking above the level of the contracting officer, and suspension of contract award or contract performance under conditions similar to those applied at GAO and GSBCA. These recommendations were rejected by the FAR Council in 1989.

Section 202(g) of this Bill provides that agency level protests in DOD be decided by officials at an appropriate level above the contracting officer, and for stay of award absent "compelling circumstances." However, there is no provision for stay of performance in situations involving post-award protests. The proposed DOD protest procedures would not provide a sufficiently credible alternative to warrant elimination of GAO and GSBCA as available outside protest forums.

The legislative history of the Paperwork Reduction Reauthorization Act of 1986, in making permanent GSBCA's authority to hear and decide ADPE bid protests, reflected on the Board's protest activities and found that they had assisted agencies to reap the benefits of competition. We believe that elimination of GAO and GSBCA as protest forums, as contemplated by this pilot program, would have the opposite effect, because vendors would lose confidence in a system where agencies have extraordinary discretion

to restrict competition and select contractors with no outside non-judicial protest remedies available.

Additional specific comments on Section 202(g) include:

° No limit is set on the number of DOD components that may be authorized to participate in the test, leading to the possibility that this could be used to eliminate existing protest procedures in a large number of procurements.

° This proposal goes beyond anything recommended by Packard Commission, the Defense Science Board, or the Defense Management Review.

- The Packard Commission made no specific recommendations regarding protests.
- The January 1987 DSB report recommended that protestors in commercial product acquisitions be required to file protests first with the Contracting Officer, but that there then be a right of appeal to GAO. (It recommended that the CO be given 30 days to decide the protest, and that GAO be given 60 days). It further recommended that the "stay" provisions be modified. Final Report of the Defense Science Board 1986 Summer Study on Use of Commercial Components in Military Equipment at 46 (January 1987).
- The "pilot program" legislation contained in the June 1989 DSB report recommended requiring protestors to file first with the Contracting Officer, with appeal to the head of the contracting activity. Appeal from the decision of the head of the contracting activity could then be made to the "Commercial Acquisition Ombudsman" created by that legislative proposal. The Ombudsman was to be within the Office of the Under Secretary of the Defense Acquisition, and could not have been a federal employee prior to his or her appointment. The proposal provided for stay of award "during a protest." Report

of the Defense Board on Use of Commercial Components in Military Equipment at A-58 - A-59 (June 1989).

Both Defense Science Board proposals thus provided for greater impartiality on the part of the decision maker than does the present proposal.

- Presumably, the reason for the reduced protest right is to permit the contracting officer more discretion to make more subjective, "value-over-price" decisions without the fear of being second-guessed in a protest. On the other hand, Congress recognized in enacting CICA that bid protests serve the legitimate function of providing a "check" on agency activities. See also Scanwell Laboratories, Inc. v. Shaffer, 424 F.26 859, 864 (D.C. Cir. 1970). The proposed legislation, by limiting a protester's administrative remedy to the agency itself, removes this valuable "check." This seems particularly inappropriate when, for these very procurements, the remainder of subsection 202 would vastly increase the amount of discretion granted to contracting officers.
- In major procurements, removal of this "check" may lead would-be protesters to institute Scanwell actions in United States District court -- which would defeat the purpose of the proposal.
- The statute leaves the protest procedure to be addressed in regulation. Thus, it is possible (even likely) that these protests will afford less in the way of discovery rights and other procedural protections than are currently available to contractors.

B. **Section 203**

Section 203 of the proposed legislation would repeal the "commercial pricing certification" requirement of 10 U.S.C. § 2323. We support the repeal of this legislation, and would suggest that it is also appropriate to repeal the corresponding provision in the Federal Property and Administrative Services Act, which appears at 41 U.S.C. § 253e.

These statutes were originally enacted in 1984 in response to Congressional concern over the $400 hammer and similar "horror stories" appearing in the press in the

early 1980s. Although the legislative history of these two statutes suggested that they were designed to remedy abuses in the pricing of spare parts, the statutes as enacted applied to all "commercial items." While the civilian agency statute adopted the definition of "item" appearing in the Office of Federal Procurement Policy Act, which referred primarily to spare parts for major systems, the statute applying to the defense agency procurement did not contain this restriction. Relying on this difference, the Government took an expansive view of the scope of the original legislation, and the interim regulations adopted in 1985 extended the requirement to all sales of commercial products to the defense agencies using other than competitive procedures. This resulted in an immediate outcry from industry that the requirements were overly burdensome. Indeed, after the Office of Management and Budget refused on three separate occasions to approve the proposed regulations pursuant to its authority under the Paperwork Reduction Act, the interim regulations were withdrawn.

In an attempt to remedy this situation, Congress amended the defense statute in 1986 to restrict the certification requirement to "spare or repair parts." 1987 Omnibus Appropriations Continuing Resolution, Pub. L. No. 99-951, § 926 (October 30, 1986). Although new proposed regulations were subsequently issued in late 1988, they still left considerable room for confusion, and they have not yet been published in final form. In the meantime, the commercial pricing certificates and related clauses appearing in the no-longer-operative 1985 interim regulations have continued to appear in numerous solicitations for which they are not appropriate.

C. **Section 208: Certified Cost or Pricing Data Threshold**

This Section of the proposed Act would raise the threshold for certification from $100,000 to $500,000. We support raising this threshold for several reasons:

a. Administrative Burden

Not only would the $500,000 level be a restoration of a previously established threshold, it would also enhance the "acquisition streamlining" philosophy that

this and other initiatives purport to foster. There simply is no need, contrary to the position of the IG, which would support the financial burden both to the contractor and to the government in reviewing these low level certifications.

b. Duplicative Legal Remedies

An increase in a cost or pricing data threshold to $500,000 does not in fact preclude the Government from pursuing action against fraudulent contractors. There is a myriad of other laws and regulations to cover these situations.

c. Small Business

The burden on small business would be alleviated by an increase in the threshold for certifications.

d. Consistency

A $500,000 level would bring the Truth In Negotiation Act certification to the same level as Cost Accounting Standards applicability.

D. **Section 217: Pilot Program**

Section 217 would authorize the Secretary of the Defense to "conduct a pilot program in accordance with standard commercial, industrial practices with the objective of identifying the potential for increasing the efficiency and effectiveness of the acquisition process." In furtherance of this purpose, Section 217 would authorize the Secretary to waive any provision of Federal Acquisition Regulation that:

- establishes procurement procedures;
- establishes preferences for particular contractors or classes of contractors;
- mandates procurement from a specified contractor or a group of contractors;
- imposes performance requirements on a contractor;
- establishes requirements for accounting for costs or for auditing, except

where the provisions are intended to ensure financial integrity of the government program or to otherwise effect the authority of the Inspector General of the Department of Defense; or

- establishes requirements for the management and testing evaluation for reporting on a program.

It appears that Section 217 would allow the Secretary to waive only those laws and regulations which are "not equally applicable to contracts to which the United States is not a party." This intent appears in the section by section analysis published in the April 5, 1990, Congressional Record on page S4267. As written, in S.2240, however, the limitation on the waiver authority of the Secretary applies only to waivers of the federal laws and regulations governing cost allowability, cost accounting or auditing.

The Public Contract Law Section of the American Bar Association has consistently supported efforts to eliminate laws and regulations which unnecessarily increase the complexity and costs of performing government contracts. We therefore support the basic purpose of Section 217 which is to allow the Secretary of Defense to waive existing procurement laws and regulations to increase "the efficiency and effectiveness of the acquisition process." However, we recommend that, under Congress' direction, the regulations set forth with more specificity the particular laws and regulations that would be waived pursuant to Section 217.

We recommend this because many provisions of federal law which are essential for the protection of the federal government's interests in procurement of goods and services and should not be waived. These include such laws as the Competition in Contracting Act (CICA) which requires full and open competition for government goods and the Contract Disputes Act, which establishes procedures for resolution of disputes arising out of the performance of government contracts. If CICA were waived, there would be no obligation for DOD to conduct competitive procurements for the pilot programs. If the Contract Disputes Act were waived, there would be no statutory basis for administrative and legal adjudication of government and contractor claims in contracts awarded under the pilot program. The United States Constitution would be the only

available source of legal authority for the contracts and we would turn the clock back to a time when the Federal courts and the Congress had "to fashion the governing rule of law according to their own standards." Clearfield Trust Co. v. United States, 318 U.S. 363 (1943).

To the extent that Section 217 contemplates waiver of the jurisdiction of outside bid protest forums, as well as waiver of any law not found in standard commercial or industrial practices, this would not be in the Government's best interests. No matter what the degree of discretion accorded to agency procuring officials, accountability to the taxpayers warrants a system of checks and balances where large sums of money are involved.

Contrary to the statement in Section 217, there are no standard commercial, industrial practices which apply to the purchase of the vast array of goods and services necessary for the operation of the Department of Defense. Commercial and industrial procurement practices vary widely from industry to industry and from company to company. Furthermore, there is no single body of law which is "equally applicable to contracts to which the United States is not a party." The Uniform Commercial Code ("UCC"), has been adopted by each of the 50 states. However, the UCC only applies to the purchase of goods. It does not apply to the purchase of services or construction contracts. The UCC has also been modified in every state and there are hundreds of decisions in these states that interpret the UCC and that varies significantly in regard to the meaning of the terms and conditions of the UCC.

A possible alternative to Section 217 involves modification of Section 824 of the Defense Authorization Act of 1990, P.L. 1010-189, to allow its application to the pilot programs which would be governed by Section 217 of S. 2440. In Section 824 of the 1990 DOD Authorization Act, Congress recognized the potential benefits "of a simplified uniform contract for the acquisition of commercial items by the Department of Defense." This simplified contract is "to include only such clauses that are essential for the protection of the Federal Government's interest in a particular contract, as determined in writing, by the contracting officer for such contract."

Recognizing that some provisions of federal law and regulations would have to be eliminated or modified, Section 824 directed that appropriate regulations be promulgated and called for the submission to Congress of proposals for legislative changes. The consideration by this Committee of Section 217 would benefit from the recommendations of the Secretary of Defense required under Section 824 of the 1990 Defense Authorization Act.

Further guidance exists for a simplified approach to government procurement in the American Bar Association Model Procurement Code for State and Local Governments. This Code was developed by the ABA with federal funding from the United States Department of Justice, Housing and Urban Development, Health and Human Services, the United States Environmental Protection Agency and with the assistance of hundreds of volunteers. It was endorsed by the ABA in 1979 and drew upon the best procurement practices and procedures of the federal government and of state and local governments. The Competition in Contracting Act drew upon some provisions of the Model Code. The Code has been adopted by fifteen states and hundreds of local governments.

E. **CONCLUSION**

The Section of Public Contract Law is grateful for the opportunity to provide these comments and commends the efforts of the Department of Defense, the Office of Federal Procurement Policy and of the Congress in seeking improvements in the procurement process. These views are presented on behalf of the Section of Public Contract Law of the American Bar Association. They have not been approved by the House of Delegates or the Board of Governors of the American Bar Association and, accordingly, should not be construed as representing the position of the Association.

**Senator BINGAMAN. All right. Thank you very much. Did any of those accompanying Mr. Gavin want to make a statement before we had some questions?**

**[No response.]**

**How do you respond to the Inspector General's position here that, on this raising of the threshold, he says that, "In 1987 our auditors found a higher incidence of defective pricing, an alarming 50 percent in contracts between $100,000 and $500,000 than in any**

other contract-value range." And then he goes on to say that for that reason they do not favor the raising of the threshold.

Mr. GAVIN. I think there are probably several answers, Mr. Chairman. For one thing, in that range, you particularly would have small businesses operating and selling to the United States Government. Frankly, small businesses have a great deal of difficulty even understanding what the Federal cost principles are, let alone applying them to their accounting systems.

And I suspect, and I do not know this for a fact, I suspect that a considerable amount of the defective pricing that has been ascertained by the DOD Office of Inspector General probably is of a relatively minor nature, a nature which may not necessarily, significantly affect the ultimate price to the government, but may in theory be defective pricing incidents.

Additionally, you know, we are dealing with an investigatory agency. They investigate. They, in fact, try to isolate situations where they feel the law is not being complied with. That does not mean that indeed the law has not been complied with. It just means that somebody has made an accusation. So the fact that on some contracts, and I think we heard that these were spare part suppliers, that with selected spare part suppliers, maybe 50 percent of those spare part suppliers, may have been accused of some noncompliance, to me is not necessarily as significant as it would initially sound.

Now, let me go on and deal with this question in a precise way. Is the requirement really necessary? What the government ought to be striving for is to get as many of these particular sellers who are selling commercial items, because that is what we are talking about, into a status where they are going to be exempt from providing cost and pricing data at all, because that is the way the government is going to get the best deal. They are going to get the lowest price. They are going to get the best access to the marketplace. They are going to get the greatest number of suppliers, small businesses and large businesses alike, competing for the government's business.

Right now, these requirements scare these small businesses to death. They are frightened of them. They call lawyers and they say, "what do they mean?" And we have a great deal of difficulty explaining what they mean. I am sure Congress has the same difficulty. And the auditors themselves have a great deal of difficulty, because as we review audits, we frequently find that they do not understand the requirements either.

So, I do not think that keeping the system in tact, in terms of whether it be $100,000 or $500,000 is necessarily the answer. The answer is to find a way that we do not need this data. Part of the solution has to be in looking at those areas that we now exempt from providing cost and pricing data, and try to make that definition broader. Try to make it a working definition that will include more products.

I had a particular example in mind—that came to mind. It was a large vendor, it was not even a small business, and this particular vendor made proprietary commercial products which are found in thousands and thousands of buildings around the United States, but they did not sell those products essentially as catalog items.

They included them in larger components. They were individual pieces in larger products that they sold. They were requested to sell some of those products to the U.S. Government, which they would have no problem doing. But they had no way of coming up with cost and pricing data for that particular product. It was made in a factory which made lots of products, not for the Government, but for the commercial world.

It was not practical to change their accounting system to in fact, accommodate the Government for a few products that were to be sold. They did not know how to price them. They could not come under an exception, even though this particular product was included in a larger piece of equipment that was sold widely, commercially. There just was not a separate catalog price to mark it with.

Senator BINGAMAN. You are saying though, that instead of worrying about changing the threshold, we should broaden the exceptions?

Mr. GAVIN. I think that would help a great deal. I would like to see both done, to be candid.

Senator BINGAMAN. To your knowledge, is there any proposal that you have seen as to how you would go about broadening the exceptions to make sense out of this?

Mr. GAVIN. That is correct. But when you have to look at what they are saying is inflated—if they mean that there is some cost included in that price that may not be fully allowable under the Federal cost principles, and that is what they mean, they are right. It probably is inflated. But, if we ask a different question, if we say, is there a cost that is being charged to the U.S. Government that is not normally charged to a commercial buyer, the answer may be a different answer.

Senator BINGAMAN. You are saying that the pricing principles do not get us the information we need to answer the right question?

Mr. GAVIN. They are very peculiar principles. They are peculiar because they have been developed for the U.S. Government in a context where we were buying widgets that only could be used for the Government. They have a long history. They came into effect to solve individual problems. Often, as the Government deals with problems, it creates a rule that may not necessarily work in all circumstances.

What I am saying is, that if we want to eliminate the overhead—and that is what we are talking about, the overhead in terms of what it takes the Government to make this system work, the overhead in what it takes a commercial seller to do business with the Federal Government under these special circumstances—then we need to bring this system a little more in line with what commercial sellers will sell in terms of pricing to their commercial buyers.

Now, if I could, I would like to turn to Wendy Kirby, who chairs our Commercial Products Committee, and I think would like to add something on this subject.

Ms. KIRBY. In response to your earlier question of whether we were aware of any proposals to broaden the exemptions, just this past year in the fiscal year 1990 Authorization Act, the Congress has directed the Department of Defense to come up with regulations on the cost or pricing data exemptions.

We are aware of some proposals that are working their way through the system now that would address questions such as what to do about commercial products that are modified commercial products, or new commercial products that may not come within the four corners of the current regulations that define what the exemptions for cost or pricing data are. I think that concept of broadening those exemptions is something that the ABA would also support.

Senator BINGAMAN. These broadened exemptions that are working their way through the system, do they make a significant difference in the workability of this statute, in your view, or are they just going in the right direction, but they do not get much done.

Ms. KIRBY. I guess all that I can say based on what I have seen personally, which has not been very much—and I understand they have been quite controversial within the Department of Defense. I guess, all I can say is that it is going in the right direction. The exemptions are being broadened. Concern is being given to the strict percentage test that currently exists in the regulations regarding what percentage of a contractor's sales have to be made to the Government versus commercial marketplace, and at what price, that there needs to be more flexibility than there is in the current system.

Senator BINGAMAN. Well, this is an area where, quite frankly, I am sympathetic to the desire to eliminate this paperwork, and I would love to find a way to do that. It is difficult when you have got GAO and the Inspector General both saying that one out of every two contracts that get audited turns up or demonstrates that the Government is being overcharged, which is what I understand their testimony to be, and then saying that in the last 3 years more than $17 billion in contract awards fell in this range, from $100,000 to $500,000. $17 billion is a lot of money.

Mr. GAVIN. But $17 billion, Mr. Chairman, is probably not the overcharge, obviously.

Senator BINGAMAN. I assume it is not the overcharge, but even if there is overcharging on half of that, which is somewhat implied in what has been testified to, it was not said, but it was somewhat implied, it does raise a lot of questions about whether or not we ought to raise that threshold. If there is another way to eliminate the paperwork where it is not helpful to the government in getting a reasonable price, that might be something we could try to do.

Mr. GAVIN. I think that is a worthy objective.

Senator BINGAMAN. I guess you have already expressed, and I alluded to your testimony earlier about the Competition in Contracting Act, it is your view that there is really no justification for granting authority to waive that Act. Is that accurate?

Mr. GAVIN. Mr. Chairman, we are not in favor of waiving the Competition in Contracting Act. The difficulty, which everyone is grappling with, and the three witnesses who preceeded me and certainly what we are trying to deal with is this, you cannot, in a vacuum, simply say we are going to waive some laws, and not know what laws. We think the Competition in Contracting Act is very important, as well as the Contract Disputes Act and other statutes, and I hear what the chair has been asking. And you are saying, well, how do we then say what is necessary to keep.

Particularly in the area of commercial products, I have a suggestion. It is included towards the end of our detailed comments. Some 16 years ago, the American Bar Association concluded a project called the Model Procurement Code. It was designed for state and local governments, and it was, in fact, supported by grants from several agencies of the Federal Government. It has been in use now by an increasing number of states. And what are we up to now, Tom, 14? Fourteen or 15 States, and literally hundreds of local jurisdictions.

Now, this is the kind of small document that the chair has indicated the committee is looking for. It does not weigh 100 pounds. I wish I had brought a copy with me today. It is a very small document, and it has very small regulations that go with it.

And I suggest that—if we really want to find a solution and not try to recreate the wheel—that particularly, maybe, in the commercial products area, DOD might take a long look at the Model Procurement Code, because it provides the basic elements of a fair, honest, and open procurement system. And it has, at least now, had the test of some time and operation. So, we know what works about it and what does not work about it.

[A copy of "The Model Procurement Code" and "The Model Procurement Code Recommended Regulations" will be retained in committee files.]

Senator BINGAMAN. Are you suggesting that the ABA Public Contract Section would take on the job of writing a Model Procurement Code for the Federal Government?

Mr. GAVIN. The project actually became a project of the entire American Bar Association, so I should not just take credit for the Public Contract Law Section, and I see some people in the room who know a lot about this subject. In fact, let me turn to Tom Madden who has long experience with the Model Procurement Code and may want to say something on the subject.

Mr. MADDEN. Just a brief comment on it, Mr. Chairman. Bill Montalto, who is sitting over here, served on the staff of that Code drafting committee and is very familiar with the development of that work. And some of the ideas in that Code ended up in the Competition in Contracting Act in the sense of the negotiated, sealed proposal concept.

The Model Code is not the answer to every problem. But it was an effort, using Federal models and state and local Government models, to come up with a simplified, straight forward, common sense system for use in procurement.

New Mexico, for example, has adopted the Model Procurement Code and uses that for State and local procurements. The regulations are relatively simple and straight forward. And there is experience. The States from New Mexico to Virginia, Maryland, and the District of Columbia have been using it, which suggests that it may be time to look at that and look at the system that we have now and make some comparisons. See if there is a way, in making the judgment on what rules or regulations should be modified for these pilot programs, to look at the Model Code as a basis. And compare what the Model Code suggests against, perhaps, what DOD is developing when coming up with a more simplified approach.

It certainly reflects the thinking of hundreds and hundreds of people in a series of public hearings across the country, and coming up with what was the best in State and local government.

Senator BINGAMAN. How long a process was that, developing the Model Code?

Mr. MADDEN. I would say it was about a 4-year process where the intensive effort was involved in developing the Code.

Senator BINGAMAN. You know our planning horizon here is just to the next election. We are not into 4-year processes.

Mr. MADDEN. Well stated, yes.

Senator BINGAMAN. All right. Well, I think your testimony is an excellent analysis of what has been proposed. And I generally agree with the thrust of it, which is that we need to get down to more specificity before we can really react to a lot of what has been proposed here. And we are hoping that we can get down to that specificity once we get the answers from the Department of Defense to some of these questions we have propounded to them.

I think that is pretty much all the questions I have. I think your explanation is good. We will, perhaps, be in touch with you, as we get more information, to get your views on some of the more specific information we receive.

Mr. GAVIN. Well, thank you, Mr. Chairman. And we would offer to provide expanded answers for the record to your questions if the committee would wish to have them.

Senator BINGAMAN. All right. We would appreciate that. We would like any additional information you have, and any suggestions that you encounter or come up with on this issue of the threshold. As I say, the option of just leaving the law where it is and raising the threshold seems to me to be fairly strenuously objected to by some of those who testified, and I think it would be good if we had some other option to also consider, which would provide some level of relief.

Mr. GAVIN. Thank you.

Senator BINGAMAN. Thank you all very much. That will conclude our hearing.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR JEFF BINGAMAN

COMMERCIAL STYLE ACQUISITION PRACTICES

Senator BINGAMAN. Mr. Math, your statement notes that "DOD has not placed the management emphasis needed to ensure that full advantage is taken of existing laws to procure commercially available products."

In your judgment, does DOD need the proposed authority to waive existing laws to take advantage of the laws currently applicable to commercial products?

Mr. MATH. We believe that DOD currently has the authority necessary to make significant improvements in its procurement of commercial products. DOD, however, has not taken full advantage of that authority. Our report, *Procurement: DOD Efforts Relating to Nondevelopmental Items* (GAO/NSIAD-89-51, Feb. 7, 1989), points out that DOD has not placed the needed management emphasis on taking advantage of the opportunities to improve the procurement of commercial products offered by existing laws.

Senator BINGAMAN. Currently, under the Competition in Contracting Act, a solicitation must describe the Government's needs in terms of a "function," "performance," or "design requirements." The proposal only requires a "product description."

How would this change improve the acquisition of commercial products?

Mr. MATH. DOD's inappropriate use of detailed specifications is often cited as a procurement problem. We assume that the proposed use of a "product description" is an effort to reduce the detail included in DOD's solicitations. We must say again, however, that DOD has not used the authority it now has to improve its acquisition of commercial products. Before DOD proposes legislative changes it should demonstrate what is wrong with existing laws so that the Congress can decide what legislative changes are needed.

Senator BINGAMAN. Currently, under the Competition in Contracting Act, the solicitation must include a statement of the relative importance assigned to all evaluation factors. The proposal, however, only requires listing the evaluation factors.

How would this change improve the acquisition of commercial products?

Mr. MATH. It is our view that firms that compete for Government contracts should be informed as fully as possible of the basis upon which their bids or proposals will be evaluated. This means that a solicitation should disclose not only the factors that will be used during evaluation, but also the relative weights of those factors. DOD's proposal should be revised to require that solicitations disclose the relative weights of the significant evaluation factors.

Senator BINGAMAN. The proposal authorizes restrictions in competition through the establishment of a "list of sources."

What is the potential impact of establishing a restricted list of bidders?

Mr. MATH. One possible impact of establishing a restricted list of bidders is that the Government procurement process might come to be perceived as a closed system, rather than one based on full and open competition. Also, depending on how frequently the list is revised, the Government may not be in the best position to take full advantage of innovative products and technologies.

PILOT PROGRAM FOR MAJOR DEFENSE ACQUISITION PROGRAMS

Senator BINGAMAN. The pilot program is premised on the belief that current laws inhibit efforts to streamline the acquisition system.

Which statutes, if any, have you identified as establishing a significant impediment to efficient and effective acquisition practices?

Mr. MATH. We agree that statutes that impede the acquisition process should be eliminated. However, it must be recognized that Congress wrote the existing statutes to address specific problems. Before concluding that any statutes should be waived, each should be examined individually to determine if the problem it was written to address has been resolved. Any determination to waive or eliminate existing statutes should be made on a case-by-case basis and not through a blanket waiver of all provisions of law or regulation.

Senator BINGAMAN. What criteria and procedures should be used to evaluate the effectiveness of the pilot program, if established?

Mr. MATH. Due to the nature of the defense acquisition process, evaluating the effectiveness of the pilot program would not be easy. The traditional measures of the success of an acquisition program have been its cost, schedule and performance. If pilot programs' results in these three areas were consistently better than those of "normal" acquisitions, then it may be reasonable to conclude that the pilot program approach was successful.

Senator BINGAMAN. Mr. Math, in your testimony you indicated that "experience in recent years provides little comfort that existing laws and regulations should be relaxed" as provided for under the pilot program. You commented that the Contractor Risk Assessment Guide Program is a better approach towards restoring public confidence and reducing Government oversight of the acquisition system.

Please elaborate on the reasons for your position, describing the benefits you see in the Contractor Risk Assessment Guide Program.

Mr. MATH. As discussed in our report *Defense Acquisition: Perspectives on Key Elements for Effective Management*, GAO/NSIAD-90-90, we believe that one of the seven elements necessary for an effective acquisition process is compliance with a strong system of internal controls. One objective of DOD's Contractor Risk Assessment Guide (CRAG) Program is to encourage contractors to develop more effective internal control systems. In doing so, we believe that the CRAG would contribute to restoring public confidence and reducing Government oversight.

Under the CRAG program, contractors who can demonstrate that their internal control systems meet the CRAG's control objectives will receive less direct Government oversight. The contractors, through their own self governance initiatives and using the CRAG control objectives as goals, will build the oversight process, including appropriate testing, into their day-to-day operations. DOD will then evaluate or test those control systems to ensure they are achieving the desired objectives.

GAO has long supported the need for effective internal control systems. Accountability for compliance with applicable procurement statutes and regulations must start with industry. The firsts line of defense in controlling fraud, waste, and abuse is an adequate control system that is fully supported at all levels of a company. An adequate control system permits a company to institute preventative steps as opposed to reacting after the fact.

Senator BINGAMAN. Can you suggest some actions that the Congress and or the Department can take to increase contractor participation in the Contractor Risk Assessment guide Program?

Mr. MATH. Higher level management commitment and participation in encouraging contractors to sign up to CRAG is essential, we believe, to the success of the program. The DLA Deputy Director recently encouraged his people to seek greater contractor endorsement and participation in CRAG. We believe actions such as this should result in more contractor participation in CRAG.

Senator BINGAMAN. Mr. Math, you also testified that "Defense Enterprise Programs and other Defense Management Report Initiatives offer DOD an opportunity to address many well-recognized defense acquisition problems."

Could you please describe the actions that DOD can take within the context of existing authority, such as the Defense Enterprise Programs, to accomplish the purposes of the pilot program?

Mr. MATH. A number of the objectives of the proposed pilot program are very similar to the results expected from the Defense Enterprise Program. The Defense Enterprise Program provides DOD the opportunity to streamline the management and reporting of designated weapon systems. Program managers of designated enterprise systems are to report through a streamlined chain of command. However, our work on the acquisition process has shown that this feature has not been implemented well.

Senator BINGAMAN. The Defense Enterprise Program legislation also provides relief from regulatory burden. It states that defense enterprise programs shall not be subject to any regulation, policy, directive, or administrative rule or guideline relating to the acquisition activities of the Department of Defense.

Can you outline some of the Defense Management Report initiatives that will address these problems?

Mr. MATH. There are a number of changes called for by the Defense Management Report (DMR) that should address long standing acquisition problems. First the DMR recognizes that the effort to resolve these problems must be sustained over a long period of time. The DMR calls for long-term and unreserved commitment on the part of DOD to improve defense management.

The DMR calls for improvements in the civilian and military acquisition workforce. These include improvements in civilians' working environment, professional rewards, recruitment and retention. The DMR points out the need for improvements on the military side as well, including specialized training opportunities and educational requirements and promotion potential up to the highest flag levels.

The DMR calls for a closer link between the resource allocation decisions and the weapon system acquisition approval process. The report states that "under the pressures of the annual budget cycle, consideration of broad policies and development of guidance on high priority objectives all too often have been neglected, and decisions made instead on a short-term, issue-by-issue basis not well-suited to optimizing the use of available defense resources."

The report includes steps to address this problem by strengthening the USD(A) role. For example:

— The USD(A) is made a key participant in all phases of the Planning, Programming and Budgeting System.

— The USD(A) will serve as a key advisor to the Secretary and the Deputy Secretary on resource decisions affecting acquisition program baselines.

— In conjunction with the DOD Comptroller, the USD(A) or the Principal Deputy will exercise so-called apportionment authority with respect to funding for programs passing through successive milestone reviews in order to ensure demonstrable attainment of minimum required accomplishments established in revised DOD directives and the successful completion of all additional exit criteria levied on programs as a result of previous DAB reviews.

— Replacing the Defense Resources Board with the Defense Planning and Resources Board to help develop stronger links between national defense policies and the resources allocated to specific programs and forces.

The DMR also states that DOD will continue to encourage industry participation in its Contractor Risk Assessment Guide (CRAG) program.

MULTIYEAR CONTRACTING ENHANCEMENT

Senator BINGAMAN. Both the GAO and the Inspector General have testified in support of the provision concerning multiyear contracting. Among other things, this provision replaces a requirement in current law for "reduced total costs" with a requirement for "substantial savings."

What is the range of savings that you would consider to amount to "substantial" savings?

Mr. MATH. Our experience with multi-year procurement shows that this change would not significantly effect the approval of multi-year candidates proposed by DOD. We annually assist the appropriation committees in assessing multiyear candidates and have found that DOD proposes—and Congress approves—many programs that do not meet the 10 percent savings threshold. The Congressional Budget Office reported last year that 14 of the 35 candidates submitted by DOD in fiscal years 1986 to 1989 did not meet the savings thresholds. Nonetheless, Congress approved 9 of those 14 candidates. Our long-standing position on multi-year procurement is that candidates should be evaluated on a case-by-case basis.

Senator BINGAMAN. Multiyear contracts provide stability by fixing contract terms over a long period but they also reduce the Government's flexibility in the out-years to meet changes in the threat and funding levels. In addition, when a multiyear contract is terminated, termination costs must be paid to the contractor.

Are the termination costs for multi-year contracts greater than those for annual contracts for similar items?

Mr. MATH. Termination costs of multi-year contracts are higher than those of annual contracts, and the Government's flexibility is reduced under multi-year contracts. However, savings is not the only criteria used to evaluate multi-year candidates. The stability of the program is a very important factor. The probability of canceling a mature, stable program that addresses a well-defined requirement should be very small.

UNIFORM THRESHOLD FOR SOCIO-ECONOMIC REQUIREMENTS

Senator BINGAMAN. Section 205 establishes a uniform threshold of $25,000 for the application of certain socioeconomic laws.

What are your thoughts as to whether Congress should establish a uniform threshold at this level?

Mr. MATH. Our response to this question depends on the reason why the thresholds are at different levels. If the levels are different simply because they were established at different times then a uniform threshold would be appropriate to simplify the administration of the socio-economic programs.

However, if the thresholds were set at different levels to purposefully address specific problems, then the thresholds should be reviewed individually to determine if the reason for the threshold level is still valid.

CERTIFIED COST OR PRICING DATA THRESHOLD

Senator BINGAMAN. Under the proposal, certified cost and pricing data generally would not be required for defective pricing audits in contracts under $500,000. Under current procedures, contracting officers generally do not request pre-award audits for contracts under $500,000.

If the threshold is raised, and if pre-award data is generally not requested, what would serve as the primary incentive for contractors to submit data that is current, accurate, and complete?

Mr. MATH. The primary incentive for contractors to submit current, accurate and complete information is the Truth in Negotiations Act. If the threshold is raised safeguards will be eliminated for contracts between $100,000 and $500,000. A review of DOD's DD350 data base showed that over $17 billion in contract actions fell in that range in fiscal years 1987 through 1989. Another thing to consider is that not only is the requirement for contractors to certify their data eliminated, the right for the Government to go back to the contractor and recover money if errors are found is also eliminated.

Senator BINGAMAN. The Department of Defense has stated that raising the threshold will eliminate the administrative burden associated with the complying with the requirement. The Inspector General has questioned this rationale since the contractor must utilize this data to construct a price proposal.

Do the acts of compiling and delivering cost and pricing data to contracting officers impose a burden on the contractor that is significantly greater than compiling the data for purposes of developing the contractor's own cost data?

Mr. MATH. We believe that contractors, as part of their normal business activity, would document the basis for their proposals, and that as implemented, the Act simply requires that the contractor certify the accuracy of its data and make that data available to the Government. If the contractor cannot support the basis for a noncompetitive proposal the Government better be very cautious about accepting that proposal. We believe that the administrative burden imposed by the certification requirement is not significantly greater than the burden of compiling the data for purposes of developing the contractor's own cost estimate.

NOTE: As recently as July 29, 1987, DOD saw no need to increased the TINA threshold because the preaward audit threshold had been raised to $500,000.

### RAISING THE DAVIS BACON THRESHOLD

Senator BINGAMAN. Section 218 of the proposal, concerning the Davis-Bacon Act, would raise the threshold under that Act to $250,000.

Do you have a position on this proposal?

Mr. MATH. DOD is proposing an increase in the threshold for the application of Davis Bacon to $250,000, permitting greater use of entry- and training-level "helpers" requiring separate wage surveys for rural and urban areas, and removing responsibility for debarment from the Comptroller General to the Department of Labor.

GAO has supported amendments to the Davis Bacon Act which are similar to those DOD is proposing. We have supported:

— Raising the threshold to $1 million for DOD contracts;

— Transferring certain administrative requirements from the Comptroller General to the Secretary of Labor and the Administrator of General Services;

— Establishing a "helper" category;

— Expanding the use of semiskilled helpers; and

— Prohibiting the use of wage survey data obtained from a metropolitan area in issuing a wage determination for a rural area and vice versa.

### ACQUISITION CORPS

Senator BINGAMAN. The Defense Management Report proposed enhancing the quality of the workforce through the concept of an acquisition corps but S. 2440 does not address the concept of an acquisition corps. Is this a matter that requires legislation or should it be handled through administrative changes?

Mr. MATH. The Subcommittee on Investigations of the Committee on Armed Services of the House of Representatives has drafted legislation to establish a professional acquisition corps. On March 28, 1990, GAO testified on that proposal and pointed out that we agreed with its goals. We agree that it is important for good people to be recruited into the acquisition work force. We strongly agreed that clear career paths with requirements for education, training, and experience are needed for all positions. We also support the idea that both military and civilian personnel should be considered equally when determining assignments.

We also pointed out that there are a number of other initiatives that relate to the subcommittee's proposals and should be considered in the context of accomplishing the subcommittee's goals. For example, the Defense Management Report (DMR) calls for the creation of a military officer acquisition corps with many of the features proposed by the subcommittee. The January 1990 DMR Implementation Report says that each of the services is taking steps to develop its acquisition corps. In addition, the Office of Personnel Management is developing a Federal pay reform package that addresses issues similar to those addressed by the subcommittee's proposal. We testified that we believe all of these initiatives should be considered in the subcommittee's deliberation on guidance or legislation for the acquisition workforce. Further, the services have expressed to us their preference to address this matter administratively and they are establishing acquisition corps without a legislative requirement to do so.

### REVENUE FROM SALE OF PROPERTY

Senator BINGAMAN. Section 401 of the proposal would permit DOD to sell its property and retain one-half of the proceeds in a special account "to be used to meet the Department's mission essential requirements that are in the best interest of national defense."

Should DOD's authority to spend money from this fund be subject to the normal process of authorization and appropriation?

Mr. MATH. We are opposed to this proposal. The current legislative mandate to close or scale back nearly 90 military installations by 1995 would provide millions of dollars to DOD outside the normal authorization and appropriation processes. In view of continuing budget deficit problems, we believe the proceeds from the sale of DOD properties should be returned to the Treasury.

[The responses to the following questions are views presented on behalf of the Section of Public Contract Law of the American Bar Association. They have not been approved by the House of Delegates or the Board of Governors of the American Bar Association and, accordingly, should not be construed as representing the position of the entire American Bar Association.]

COMMERCIAL STYLE ACQUISITION PRACTICES

Senator BINGAMAN. Mr. Gavin, your statement notes that the Government Acquisition System was developed primarily with non-commercial products in mind, and that "some change to the system may be appropriate when purchasing commercial products."

Which statutes do you see as the primary candidates for waiver or modification in terms of facilitating the acquisition of commercial products?

Mr. GAVIN. We support the repeal of "commercial pricing certification" requirements of 10 U.S.C. 2323 and believe that it is also appropriate to repeal the corresponding provision in the Federal Property Administrative Service Act, which appears at 41 U.S.C. 253(e). We support proposed section 208, which would raise the threshold for certified cost or pricing data from $100,000 to $500,000. Raising the level to $500,000 will simplify administration by making the Truth In Negotiation Act certification threshold the same as Cost Accounting Standards applicability. In addition, we support modifying the definition of when commercial products require certified cost or pricing data so as to exclude a greater number of such products from this requirement when sold in substantial quantities.

In commercial product acquisition, the Congress may wish to consider the utilization of significant portions of the American Bar Associations's Model Procurement Code for State and local governments approved on February 13, 1979, by the Association and adopted by 14 States and hundreds of local governments. The entire code is only 75 pages, including commentary and the accompanying recommended regulations only an additional 247 pages. These statements of basic procurement policy and implementing regulations could fill the void left by waiving the more complex set of existing Federal statutory and regulatory requirements while still providing for free and open competition and essential fairness. The section will forward the committee a copy of the Model Procurement Code.

Senator BINGAMAN. The administration's proposal for "commercial style procedures" would apply not only to "commercial products" but also to any system, no matter how complex or expensive, so long as at least one article has been supplied satisfactorily to the Government. Should the "commercial style procedures" be extended to non-commercial products at this time?

Mr. GAVIN. The Section of Public Contract Law does not believe that "commercial style procedures" should be extended to non-commercial products at this time, but rather should be limited as a test to commercial products only. It would be premature, for example to apply "commercial style procedures" to complex acquisitions simply because one component produced has been previously supplied to the Government.

Senator BINGAMAN. Under what circumstances, if any, would it be appropriate to develop restricted lists of bidders or to rotate procurements among bidders on a list?

If such techniques were used, how long should a list be used prior to letting new offerors gain entry to the list?

Mr. GAVIN. Lists of "prequalified" bidders could be developed for particular products or categories of products based on previous sales to the public and other product qualifications developed by the Agency. An example of how such a list could operate may be gleaned from the long-standing General Services Administration's Multiple Award Schedule Program. Under that program, multiple contractors are eligible to sell products within a given product category. Agencies are free to purchase from companies on the schedule up to a maximum dollar limitation. DOD could use a similar program that permits new offerors to gain entry to the list on an annual basis.

It may also, however, be appropriate, without restricting competition, to require sources of commercial products to demonstrate that they are able to meet specifications in advance of the issuance of a solicitation, so long as this opportunity is renewed at least annually. In this alternative, price would still be a factor in the ulti-

mate procurement as opposed to price being determined at the time the contractor bids for placement on the schedule.

Senator BINGAMAN. In your judgment, does DOD need the proposed authority to waive existing laws to take advantage of the laws currently applicable to commercial products?

Mr. GAVIN. The Public Contact Law Section believes that the proposed broad waiver of existing authority is unnecessary and undesirable without replacement by a system such as the Model Procurement Code. However, individual changes would assist in achieving the overall goals sought. Additional statutory guidance could help encourage DOD's efforts in this area.

Senator BINGAMAN. Do you believe it is reasonable to assume that if certain statutes impose a significant burden on the acquisition of commercial products, those statutes can be listed and accompanied by supporting examples prior to granting of a waiver authority?

Mr. GAVIN. The Public Contract Law Section believes the response to this question is yes. We question, however whether developing such a list and simply waiving selected statutes would in fact result in an effective system for commercial products procurement. The preferable approach would be to develop free-standing procedures for commercial products procurement that would supersede any portions of existing statutes with which they were inconsistent.

Senator BINGAMAN. The proposal authorizes DOD to establish a test bid protest forum that would preempt the bid protest authority of the GAO and the Boards of Contract Appeals.

How would you structure such a test to ensure no adverse impact on the quality and fairness of defense acquisitions?

Mr. GAVIN. The Public Contract Law Section recommends that the present bid protest authority of the GAO and GSA Board of Contract Appeals be retained while any test of an enhanced intra-agency protest process within DOD is conducted. The procedures called for by section 202(g) for the pilot program should be further strengthened to provide for stay of performance of an awarded contract under circumstances similar to the stay of award which section 202(g) already contemplates. Once such intra-agency protest procedures are in place, a period of one or more years could be designated as a test whereby the results and effectiveness of such procedures to reduce the number of protests filed in outside forums could be ascertained and judged.

PILOT PROGRAM FOR MAJOR DEFENSE ACQUISITION PROGRAMS

Senator BINGAMAN. The Pilot Program is premised on the belief that current laws inhibit efforts to streamline the acquisition system.

Which statutes, if any, should be primary candidates for waiver in terms of statutes that impose significant impediments to efficient and effective acquisition practices?

Mr. GAVIN. This subject deserves careful and continuing study. What follows is a partial list for illustrative purposes. As previously indicated, the Public Contract Law Section supports raising the threshold for certified cost or pricing data from $100,000 to $500,000 as proposed by section 208. The multiplicity of the other certifications requires review, with the goal of eliminating unnecessary paperwork and administrative burdens. Protection of contractor rights in data and software should be consistent with commercial practices. A review of present audit requirements should be undertaken to eliminate duplication and unnecessary burdensome elements. Finally, while the section supports enforcement of criminal laws where appropriate, the time has come for easing of the adversarial relationship between Government and industry, to permit the achievement of national and international procurement goals in a productive partnership, characteristic of other leading industrialized nations.

Senator BINGAMAN. What criteria and procedures should be used to evaluate the effectiveness of the pilot program, if established?

Mr. GAVIN. The Public Contract Law Section believes that (a) meeting budget estimates, (b) furnishing quality products, (c) time savings, and (d) personnel savings are among the criteria that should be utilized to evaluate the effectiveness of a pilot program.

Senator BINGAMAN. You recommend that Congress require the Department of Defense to specifically identify particular laws that would be waived because, "many provisions of Federal law . . . are essential for the protection of the Federal Government's interest in procurement of goods and services and should not be waived." You also note that, "Contrary to the statement in [the Administration's proposal],

there are no standard commercial, industrial practices which apply to the purchase of the vast array of goods and services necessary for the operation of the Department of Defense."

In light of your comments, what criteria and procedures would you suggest for inclusion in a test program to insure that it: (1) effectively tests streamlining concepts; and (2) protects the fundamental interests of the Government in a sound acquisition process?

Mr. GAVIN. The Public Contract Law Section would suggest that: (1) such a test commence with a single major acquisition program; (2) which should consist primarily of commercial components; (3) which should be selected from an existing stable program; (4) which would run as a test acquisition—perhaps with a geographical distinction—side-by-side with a similar acquisition for the same product utilizing present procedures, and (5) that the individuals assigned to "the test acquisition be among the most qualified so that the team be of demonstratable excellence."

Basic procedural protections such as the Contract Disputes Act and the Anti-Deficiency Act should not be waived.

ADDITIONAL INFORMATION BEING SUBMITTED BY THE PUBLIC CONTRACT LAW SECTION IN RESPONSE TO ORAL QUESTIONS OF THE COMMITTEE

The committee raised several questions in conjunction with testimony received from the Department of Defense's Inspector General's Office concerning statistics developed in the acquisition of spare parts which resulted in the conclusion that:

In 1987, our auditors found a higher incidence of defective pricing—an-alarming 50 percent—in contracts between $100,000 and $500,000 than in any other contract value range.

Based on this experience the DOD Inspector General's Office supports the return of the threshold for mandatory submission of cost or pricing data to $100,000 based on the supposed high incidents of defective pricing found in contracts of $500,000 or less. This subcommittee asked whether or not this statistical conclusion appeared to be accurate and supportable?

Senator BINGAMAN. It is our understanding that the Inspector General's statistics were based on a single audit of spare parts pricing on 18 contract actions in the $100,000-$500,000 range between 1984 and 1987. We further understand that the contracts included in the audit were selected through screening techniques designed to select actions with a high probability of being overpriced. Of the 9 contracts in this range on which defective pricing was alleged by the auditors, we understand that at least 7 have settled, for a total recovered of $113,763, or 5.1 percent of the contract value for the 7 actions. In addition, we understand that a higher percentage of contracts were allegedly overpriced in all ranges above $1 million—for example, 79 percent of the contracts in the $5-$10 million range were alleged to involve defective pricing, as were 83 percent of contracts over $25 million. The results of this audit would not appear to support the broad conclusions stated in the testimony received from the Inspector General's Office; the committee may wish to confirm with that Office whether our information is correct, or whether there are additional audits on which its conclusions were based.

[Whereupon, at 3:43 p.m., the subcommittee adjourned.]

# DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1991

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MONDAY, MAY 21, 1990

U.S. SENATE,
SUBCOMMITTEE ON DEFENSE INDUSTRY AND TECHNOLOGY,
COMMITTEE ON ARMED SERVICES,
*Washington, DC.*

## DEPARTMENT OF DEFENSE LABORATORY MANAGEMENT

The subcommittee met, pursuant to notice, at 2:02 p.m., in room SR-222, Russell Senate Office Building, Senator Jeff Bingaman (chairman of the subcommittee) presiding.

Committee member present: Senator Bingaman.

Professional staff member present: William H. Smith.

Minority staff members present: Jonathan L. Etherton and John E. Mansfield, professional staff members.

Staff assistant present: Melissa Ann Ramsey.

Committee members' assistants present: John Gerhart, assistant to Senator Bingaman; Patrick F. McCartan, assistant to Senator Wilson; and Charles G. Pearcy, assistant to Senator Lott.

### OPENING STATEMENT OF SENATOR JEFF BINGAMAN, CHAIRMAN

Senator BINGAMAN. The subcommittee meets this afternoon to receive testimony on ways that the Department of Defense in-house laboratories can be made more effective and remain viable for the future years. Over the past several years we have had a variety of studies that address the challenges facing the Department of Defense labs. Studies have identified problems, recommended changes, and removed restrictions that the labs have in performing their assigned missions.

In 1987 the Defense Science Board Summer Study focused on strengthening the technology base. It took a special look at the effectiveness of DOD's labs. One of the recommendations was that each service create at least one demonstration laboratory project. The demonstrations would be assigned to attract and retain the highest quality staff, streamline contracting procedures, improve personnel management, and increase each laboratory's directors in accountability and authority. In the Fiscal Year 1990 Defense Authorization Act the Armed Services Committee endorsed the Defense Science Board recommendation and directed that they be implemented.

Dr. Charles Herzfeld is the Director of Defense Research and Engineering. He will give us his assessment of the Department's

progress in the plans and in trying to implement this demonstration program. The 1987 Technology Base Summer Study also noted that conversion of some existing laboratories to a Government-owned, contractor-operated, or GOCO status, might be beneficial.

Professor John Deutch is the Provost of MIT and Chairman of that 1987 Science Board Summer study. He is joining Dr. Herzfeld on the first panel to present his views on the DOD laboratories in general and, in particular, his recommendation that they be converted to GOCO's.

In order to gain a better appreciation of the progress being made and the problems that we are encountering—are being encountered on a day-to-day basis in laboratory operations—the subcommittee has also invited three laboratory technical directors as a second panel to provide us with their testimony and recommendations on laboratory management.

Dr. Carl Thornton is the Director of the U.S. Army's Electronics Technology and Devices Laboratory at Fort Monmouth, New Jersey. Dr. Thornton had a distinguished career in industry before taking his present position. He has introduced many innovative technology management ideas at the Laboratory. Projects at his facility cover many of the technologies to be included in this year's Defense Department Critical Technologies Plan.

Dr. Tim Coffey is the Director of Research of the Naval Research Laboratory, one of the nation's premier research institutions. It is currently the only defense lab that has a Nobel Laureate on the staff. Dr. Coffey has been a leader in studying better ways to train the youth of America in science and technology and has been attracting and retaining the very best scientists, mathematicians, and engineers to his laboratory.

The third member of the second panel is Dr. Keith Richey who is the Technical Director of the Air Force's Wright Research and Development Center. The Air Force has consolidated five of its top technology activities under a single development center covering advance materials, aero propulsion and power, flight dynamics, electronic technology in avionic systems. These laboratories either collectively perform or oversee much of the Air Force's technology base activities in these areas.

We are very pleased to have all of these gentlemen provide their views of the current status of DOD's management of its laboratories.

Senator Wallop is not able to be here today. Let me also acknowledge that Dr. George Millburn who works with Dr. Herzfeld is here. We very much appreciate his presence and look forward to his comments. He is a regular witness before this subcommittee and we have great respect for his views.

I think we will begin with Dr. Herzfeld and let him present the view that he has of the Defense Laboratory Demonstration Program and any other subject that he would like, then if Dr. Millburn has some comments we will hear those, and then Professor Deutch. After a question and answer time, we will then go on to the second panel.

Thank you very much for being here, Dr. Herzfeld.

**STATEMENT OF CHARLES M. HERZFELD, DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING, DEPARTMENT OF DEFENSE; ACCOMPANIED BY GEORGE P. MILLBURN, DEPUTY DIRECTOR, DEFENSE RESEARCH AND ENGINEERING FOR RESEARCH AND ADVANCED TECHNOLOGY**

Dr. HERZFELD. Thank you very much, Mr. Chairman. You stated my name and my job so I do not have to repeat that.

With your permission, I would like to make some brief remarks and introduce for the record the piece of paper which was submitted to you and then let Dr. Millburn present a very quick overview of how we think the plan is actually going to work, which I think would be useful background for this discussion.

Senator BINGAMAN. That is fine. We will include all of the witnesses statements in full in the record, so go ahead and summarize your testimony, and proceed in any way that you like.

Dr. HERZFELD. Thank you very much. First of all, I would like to say that this is really a dream come true. I have been worrying about this problem for a long time. I used to work at DOD, the great Naval Research Laboratory, in fact, which was then the premier laboratory of the Department. And, I believe it still is in terms of scientific quality. I then went to another in-house laboratory of the Department of Commerce, the Bureau of Standards. From there I joined the Pentagon.

All of my professional life, more or less, I have been concerned about the quality of the contribution of the in-house laboratories. I participated in a number of the Defense Science Board's efforts over the years to get some major improvements into the system that are clearly needed. These improvements were usually not attempted, and when they were attempted, were not successful.

I participated peripherally in this study that John Deutch chaired. We had a number of discussions about it. I was running a somewhat parallel effort on technology strategy that you know about. We made sure that our views were mutually consistent. I was very excited, when I came back to the Department in March, to see this enormous effort going on here. I think this time we have a real chance and an unequaled opportunity to make a real difference with a very big system.

The Laboratory Demonstration Program is an essential part of the multi-tiered and multi-directed attack on the problem of how to manage the RDT&E effort of the Defense Department. I have reviewed it before with this committee and I expect we will be back with more detailed discussions of these matters as we go on. But, today, we are here to present the demonstration report and to discuss it with you.

[The Executive Summary of the DOD report on the Defense Management Review Laboratory Demonstration Program is attached to submitted testimony. The entire report will be retained in committee files.]

I think it is important to realize that we got here, where we are, not through malice or ignorance so much as the happenings of large bureaucratic moves. So many of the regulations that impede the laboratories from functioning well were well-intended, well-meant, and were put in to solve a different problem, and they acci-

dentally, more or less, made it much more difficult, close to impossible, for the laboratories to act efficiently. It is not useful to blame people, but it is useful to try to fix what we can.

We want to address the retention and recruitment of highly qualified engineers. We want to improve the execution of the R&D-related contracting process. We want to modernize the physical plants of the laboratories. And we want to increase the range of authority of the laboratory directors. Some of these can be done with existing authority. Some need changes in the regulations, but not in the law. Others may require change in legislation and those will be identified for you today and later on, as we go through the process.

We have established a demonstration laboratory program working group of very distinguished people in the laboratory system. They work with Dr. Millburn and his staff to make sure that we keep an overview of what is being done and how it is being done and can advise, help, and remove roadblocks that are likely to occur as these reforms work their way through the system. All management systems the size of the Defense Department have a good deal of inertia, and not invented here, problems. We plan to help with those as much as we can.

The program was approved by Mr. Atwood and Mr. Betti and the services have chosen a certain number of R&D centers so that this demonstration program can be done. A rather large fraction of the in-house technical strength is involved; about a quarter of the scientists within the Defense Department are involved one way or another in this demonstration phase. So, it is not a small experiment; it is a big one. It addresses perhaps a quarter of the relevant institutions, and about a quarter of the people. So, it is important.

If we begin to see success, if we feel we are on the right road, we can move quickly to expand the scope and turn from demonstration to implementation. We are thinking about how we would do that.

What are some of the things we need? We need, on the personnel side, direct authority to hire people at the local level. We need the authority to designate three percent of our science and engineering positions, the GS–16, GS–17, and GS–18 equivalent, we need appropriate specialist salary rates for specialists in highly critical fields. We need a dual career ladder for technical people up to the GS–18 equivalent.

Let me explain that formula to you. If you do not have a dual-career ladder what typically happens is a very good technical person, in order to get promoted, has to be turned into a manager. If he or she is a good technical person, but a poor manager, you lose twice, because you lose a good technical person and you get a poor manager in the process. On the other hand, we must not stop the ability of technical people to stay on and do technical things, if that is what they do best.

So, I think it is absolutely critical to set up a dual-career ladder to go all the way to the top of the pyramid. If it does not, then the technical people will always feel that they are second-grade citizens.

I have worked with this concept for many years. I have been able to implement it in some of my earlier non-government activities

and it makes all the difference in the world. It really does. The results are that at the entrance level, there are bright young people coming in who can get all the way to the top just doing science and engineering. They do not have to become a manager if that is not what they want to do.

I dare say, some of the most creative technical people really do not want to manage; and they know they are not terribly good at it. Yet, we make them do this in order to get them promoted. It is very important that we get this ability.

We need to simplify the way the R&D organizations contract, both for R&D and other goods and services. It makes no sense to apply the rules that we apply to buy, for example, 50 destroyers, to our laboratory buying $100,000 worth of technical services for a $100,000 piece of equipment or even a $1 million piece of equipment. But, somehow we wind up in that posture. We can fix that. It needs to be fixed.

The facilities need refurbishing. There is a problem with the Military Construction procedure in that it is slow and uncertain and the funds compete for many, many other infrastructure requirements. I think the Department and the Congress can do a great deal by thinking about how to solve this problem because it is really a different account. It is not the same as rebuilding a shipyard or rebuilding a depot; it is different.

We need more local autonomy and we need some more autonomy for the Department to make priority choices that are, how shall I say, not wrapped up with that great problem called MILCON. Some way, surely, can be found to separate these. We are asking for some help with that. There was an experiment called the Defense Relocation Account. We may want to revive that. It would require real capital and some simplifications in the procedures. The details of that I would like to leave to others to explain.

Most importantly, perhaps, we need to increase the management authority at the local level. The laboratory directors should control their support activities. They should have longer tenure so that they are not changed every few years. They should have fewer reporting levels. A lot has been done about the reporting levels, but I think more can be done about reducing those. They need increased contracting authority for the laboratory, as I said. And they need a larger discretionary R&D fund to do the analog of independent R&D in industry. The country has decided that is a good thing for industry. I think it is also a good thing for in-house laboratories. We need to strengthen that and we need to make it easy to use.

We need criteria that are a success, that are measurable. The task force that John chaired was very strong on that and we have worked hard to come up with some criteria. Dr. Millburn can describe those if you wish. We can supply material for the record on that, as well.

Now, some of this is still experimental and we will see what works best. It is clear that you need clear-cut criteria for success. This goes with accountability; you cannot hold people accountable if they cannot show that they have done a good job or, if you cannot show that they have not done a good job. If it is all in a big talk stage, that is not good enough to manage and we want to fix that. I think we can.

That is really the end of my immediate remarks, Mr. Chairman. My suggestion is that we have Dr. Millburn go quickly through his explanation of what the program does and then we will be happy to answer any questions.

[The prepared statement of Dr. Herzfeld follows:]

**TESTIMONY OF**
**DR. CHARLES M. HERZFELD**

Mr. Chairman and Members of the Committee. I am Dr. Charles M. Herzfeld, Director, Defense Research and Engineering. With me is Dr. George P. Millburn, Deputy Director, Defense Research and Engineering for Research and Advanced Technology. We are pleased to testify on behalf of the Department of Defense on initiatives designed to strengthen and streamline the management of the Defense Technology Base. The Department has long based its strategy for national defense on superior technology to counter our adversaries' numerical advantage. A critical ingredient in the fulfillment of that strategy is the DoD laboratory system.

First-class laboratories, providing world-class scientists and engineers with state-of-the-art equipment and facilities, are essential if we are to continue to discover and exploit superior technology in support of national defense. Unfortunately, the task of maintaining high quality R&D laboratories within the Department has grown more difficult with the years. Central to this problem has been the accretion of statutory and regulatory restrictions which were designed to remedy difficulties in other arenas, but have in effect frequently impeded efficient execution of science and technology at the Defense laboratories. These adverse effects have been especially evident in the recruitment and retention of highly qualified scientists and engineers, the expeditious execution of the R&D-related contracting process, the modernization of the physical plants of the defense laboratories, and the range of authority of laboratory directors.

These problem areas have been highlighted in a number of studies of the defense laboratories, the most recent being the Defense Science Board 1987 Summer Study on Technology Base Management. The issues addressed and the recommendations made in this study have received consideration both in the Congress and at the highest levels in the Department of Defense.

Through Senate Report 101-81 on the National Defense Authorization Act for Fiscal

Years 1990 and 1991 the Congress endorsed the recommendations of the 1987 Defense Science Board study, and directed the Department to implement them. At the same time, the strengthening and streamlining of the Defense laboratory system was included as an important element of the Defense Management Review (DMR) mandated by Secretary of Defense Cheney. In order to implement the desired changes, Deputy Secretary of Defense Atwood initiated the DMR Laboratory Demonstration Program on November 20, 1989, and that program is now in the active implementation phase. The features of the Laboratory Demonstration Program are set forth in a report currently under preparation for the Congress.

It is important to emphasize at the outset that the implementation approach chosen by the Department pursues the desired changes at three levels: (1) those actions which fall within the authority of DoD; (2) those actions which lie within existing law but which require approval outside DoD, principally by the Office of Personnel Management (OPM); and (3) those actions which require changes in legislation. The plan does not describe in detail how each management change is to be implemented, but rather, establishes a DMR Demonstration Laboratory Program Working Group to oversee and evaluate the changes that the Services develop to meet the requirements of the program. The Working Group which consists of representatives from the Services, OPM, and OMB is developing and coordinating the regulatory and legislative proposals that address issues which fall within categories (2) and (3). We look forward to working constructively with the Congress in areas where legislative changes are required.

Participation in the DMR Laboratory Demonstration Program was granted to those Defense laboratories nominated by the Services and approved by Under Secretary of Defense for Acquisition John Betti. Collectively, the Demonstration laboratories employ approximately a quarter of the Services' scientists and engineers (S&Es): approximately 31 percent of Navy S&Es; approximately 21 percent of Army S&Es; and approximately 12 percent of Air Force S&Es. These laboratories represent a broad base of mission areas, science and technology strengths, laboratory sizes, workforce profiles, R&D

program sizes, financing arrangements, management approaches, and perceived levels of effectiveness. As a group, these laboratories represent an effective cross-section of essential in-house laboratory capability.

Now, I would like to highlight features of the initiatives in the form of principal areas of concern.

The personnel management initiatives seek: automation of position classification and installation level standards; direct hire authority for all positions; local acquisition, development and retention of senior experts; authority to designate three percent of all S&E positions as "super-grades"; appropriate special-salary rates; award authority consistent with activity budget; recruitment and retention bonuses; and non-career appointments for retired distinguished senior experts.

It is our belief that such measures will help to compensate at least in some measure for the unfavorable compensation levels in government relative to the private sector.

The R&D contracting initiatives seek: to reduce complex and time-consuming procurement methods in contracting for R&D supplies and services. Additionally, a variety of streamlining changes will be proposed to correct statutory requirements which are detrimental to effective management of technology base programs.

We believe these measures will result in streamlined procurement procedures which are appropriate to the R&D process in contrast to maintaining the cumbersome processes which are more appropriate to the procurement of large quantities of complex operational military systems.

The facilities refurbishment initiatives seek: alternatives to Military Construction (MILCON) procedures to improve R&D facilities; fiscal authority thresholds large enough to make a difference; streamlined decision making; reestablishment of the Defense

Relocation account (DRA) with significant capitalization; fenced MILCON funds to increase priorities for facilities at RDT&E activities; and consolidation of strategic planning.

Measures such as these are mandatory as a means to place modernization of Defense R&D facilities on a sound basis and make progress toward reducing the current 138 year replacement rate for R&D facilities to a more acceptable level.

The management authority initiatives seek: local laboratory director control of essential support activities with authority modeled on the separate-profit-center concept of the private sector; longer tenure for laboratory directors; fewer reporting levels; increased contracting authority for laboratory directors that covers services, products, and facilities; discretionary R&D funds for laboratory directors for enhanced in-house independent research and exploratory development with after-the-fact annual performance review.

These measures are designed to vest Defense laboratory directors with levels of authority more comparable to those which exist for directors of the better private-sector R&D laboratories.

Finally, I would like to address briefly the criteria we are using to evaluate the various reforms implemented under the DMR Laboratory Demonstration Program. In their 1987 Summer Study Report the Defense Science Board recognized that, "...quantitative, objective, output-oriented measures of the performance of the Technology Base system simply do not exist..." The DSB further noted that, regarding weaknesses in the program, "...no useful, well-understood and well-accepted measures of merit have been developed to judge results, performers or managers..." Accordingly, the Deputy Secretary of Defense tasked the Services to identify those parameters that are especially important to their particular operations and missions which could be used as "Measures of Success" for the demonstration program. The Services identified specific

"indicators" which they believed would most accurately relate to each of the issue areas addressed by the specific action requirements in the Demonstration Program.

The selected indicators were reviewed and refined by the OSD Working Group and will be used to track the progress of the Services in implementing the program. However, we are cautious to point out that use of such indicators as "measures" may not always reflect the true health or improvement in any one laboratory, or in the aggregate of demonstration laboratories. The current measures are considered only as the initial measures for implementing the Demonstration Program. They will be refined, or changed appropriately as experience with their use is analyzed and evaluated.

Thank you for the opportunity to testify on this important matter.

Dr. Millburn and I will be pleased to address your questions.

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THE DEFENSE MANAGEMENT REVIEW LABORATORY DEMONSTRATION PROGRAM

EXECUTIVE SUMMARY

Recent studies conducted by the Defense Science Board (DSB) and validated by the DoD Interagency Task Force on Technology Base Management have shown that the quality, productivity, and effectiveness of DoD laboratories can be significantly improved by implementing specific changes in personnel management, R&D contracting procedures, facilities refurbishment, and the management authority of laboratory technical directors.

The Defense Management Review (DMR) Laboratory Demonstration Program was established on November 20, 1989, to demonstrate that management changes recommended by the DSB will lead to greater efficiency and productivity at DoD laboratories. Under this program each Service was directed to select, as a minimum, one laboratory to be designated as a Demonstration Laboratory at which specified changes would be implemented. The Under Secretary of Defense for Acquisition (USD(A)) was assigned oversight authority, and a joint working group is coordinating the implementation of the program.

The USD(A) has designated a selected number of representative laboratories to participate in the DMR Laboratory Demonstration Program and has established the "measures of effectiveness" that will be used in evaluating the program. The selected laboratories represent a broad cross-section of essential in-house capability for research in science and technology and its subsequent transition to Service use. The

DMR Laboratory Demonstration Program Working Group has seven subgroups for detailed oversight of the changes being implemented at the Demonstration Laboratories.

The DMR Laboratory Demonstration Program is being implemented via three processes, corresponding to those actions which: (1) are within the purview of the Services or OSD; (2) require approval outside DoD but lie within existing law; or (3) require changes in legislation. The Services enthusiastically support the program, as it provides opportunities to implement solutions to certain long-standing problems. Full realization of the procedural, regulatory, and legislative reforms is expected to enhance significantly DoD R&D performance.

Senator BINGAMAN. Dr. Millburn, why don't you go through your presentation. Then we will call on Professor Deutch to make his comments.

Dr. MILLBURN. Thank you, Mr. Chairman. Dr. Herzfeld has already mentioned that the start of all this was with the Defense Science Board Study in 1987. Within the Department, we then formed a task force on management performance demonstration projects, which is chaired by the Director of Research and Engineering. They finished their work last year.

## DMR LABORATORY DEMONSTRATION PROGRAM

OBJECTIVE: To demonstrate that changes in infrastructure and management procedures will result in improved productivity and effectiveness of DoD Laboratories.

SCOPE: At 29 DoD Demonstration Laboratories, implement changes in four areas:

- Procurement/contracting operations;
- Personnel procedures;
- Facilities modernization process; and
- Authority of Laboratory Directors

APPROACH: Three levels of activity:

- Implement changes within the authority of DoD.
- Seek and implement regulatory relief from other governmental agencies.
- Develop legislative proposals for fundamental changes.

We certainly have an approach to the demonstration program which occurs in three phases, as Dr. Herzfeld said. First, we will do those things that we already have the authority within the Department to do, and then we will go to the outside agencies from which we need permission to do other things. This is primarily the Office of Personnel Management, and they have indeed responded favorably to the requests we have made to them so far for some of the personnel requirements.

## OBJECTIVES

| | |
|---|---|
| Personnel System | • Regulatory and legislative initiatives supporting the recruitment and retention of the brightest and most talented scientists and engineers. |
| R&D Contracting | • Procurement procedures tailored to support R&D through regulatory and legislative relief. |
| Facilities Modernization | • Procedural and legislative changes leading to enhanced visibility of MILCON needs of labs. |
| Management Authority | • Delegate more authority to Laboratory Directors<br>• Require support services to report to Directors<br>• Require minimum of 5% discretionary funding (retrospective-oversight) for ILIR and IED Program |

And, finally, there are those actions that may require legislation, and we are working with the OSD Legislative Review Task Force to consider putting those into the package which will be delivered to the Congress. But, we are looking at the four different aspects: personnel management, the R&D contracting, management authority, and the laboratory discretionary R&D.

## PERSONNEL INITIATIVES

MEASURES OF PROGRESS:

- Personnel project similar to the China Lake or NIST Personnel Demonstration Projects implemented at all Demo Labs (legislative)
- 300 S&T positions approved by OPM for DoD laboratories (FY1991).
- Direct hire authority for Ph.D. S&E's authorized by OPM (FY1991)
- Hiring freeze waived for scientists and engineers at Demo Labs (Jun 90)
- Local examining authority for S&E's in labs approved by OPM (Jun 90)

STATUS:

- Direct hire authority obtained from OPM for Ph.D.'s; obtained April'90 and to be implemented June'90.
- Local examining authority obtained from OPM for GS-9 and above; obtained April'90 and to be implemented June'90.
- Negotiations with OPM underway to secure 300 S&T positions for labs.
- Personnel initiatives workshop to be held June 26-27, 1990 to explain local authorities to lab personnel support organizations.

The key components in the program would go directly to the contracting procurement initiatives, as Dr. Herzfeld has said. We are attempting now to streamline the regulations that have developed

over the years, and streamline down to those that are required by law. This will certainly result in great streamlining and a great deal of improvement in the efficiency of the laboratory in doing the contracting. We wish to tailor this to the level of complexity of the procurement, as Dr. Herzfeld said. There is a great deal of difference between laboratory equipment and buying complex weapons systems. We do not believe that the same measures should be applied to both of them.

We are making good use now of area announcements and will continue to develop that, which is encouraging. The Competition in Contracting Act is appropriate and we will simplify the whole auditing process, and the whole contracting process, for the laboratories.

We are suggesting that we do certain things to simplify the personnel actions which we can do in-house and we now have automated position descriptions which will be instituted by the demonstration laboratories. It will be possible to turn out position descriptions in a small fraction of the time currently required. We have received permission for direct-hire authority from the Office of Personnel Management (OPM).

And, as Dr. Herzfeld mentioned, it was very important in order to keep the laboratory experts, the scientific experts in the laboratory, to having dual-ladder and we will be considering asking for the authority to have up to three percent of the scientists and engineers in the super grades in the non-supervisory positions. The Senior Executive Service requires the management caveat which is not appropriate with the type of people we are considering.

We also are considering asking for retention and recruitment bonuses and for the possibility of having non-career appointments of retired, but distinguished senior experts to join the laboratories. This may require consideration of some of the recent acts restricting the ability of individuals to return to their careers after government service.

We feel very strongly that the laboratory directors, if they are going to be measured by their productivity, have to have the authority to perform properly. We are looking at actions which will increase the decision authority of the laboratory directors. This includes, of course, the authority to contract up to the statutory limit of $2 million rather than the current limits which are imposed by various regulations. We want a minimum 4-year appointment of laboratory directors, with renewal reviews for their performance; having them removed if they are not performing well, but with the possibility of reappointment based on the performance level.

It is very, very important that we have an effective program of in-house laboratory independent research over years. This has tended to degrade the laboratories. We want to build this up to the level of approximately five percent of the total monies spent at the laboratory that could be diverted to special projects at the discretion of the director. In order for this to be effective, I believe it is important that it be at the director's sole discretion, and that there be after-the-fact reviews of the performance. Future allocations would be based upon the ability of the laboratory director to demonstrate adequate in-house research results.

The next one is the proposals which are put in for the Office of Personnel Management. They have written back saying that they will grant these requests to the Department. We are working with the staff of Mrs. Newsome who developed the detailed requirements.

The final charts will list very quickly those parts of the Demonstration Program which may well require legislative relief. We are discussing those, within the Department, and they will be forwarded to the Congress depending upon the results of the in-house review.

## MANAGEMENT INITIATIVES

MEASURES OF PROGRESS:

- Laboratory Directors appointed for 6-year tenure (FY1991).
- Laboratory Directors technical qualification requirements raised (FY1991).
- 5% discretionary fund for ILIR and IED implemented (FY1991)
- Personnel and contracting support organizations co-located in laboratories and supervisory control of the laboratory directors by Nov 90.

STATUS:

- USD(A) Action package for Executive Conference is prepared and submitted for approval by DDR&E
- USD(A) Action package for establishing technical qualifications requirements and tenure for Lab Directors is prepared and ready for coordination.
- Action package for fiscal management (Comptroller) initiatives under development.

These are some of the things we would like to have: more within personnel. We would like to have the authority to grant cash awards for performance consistent with the budget without having arbitrary limits on it. We would like to have special bonuses to help us in the recruitment and retention of our experts, and pay banding which is very similar, and is being used now in the test programs at Naval Weapons Center and at the Naval Ocean Systems Center; we would like to have that across the board. We would like to have hire authority for new graduates with certain restrictions.

## R&D FACILITIES MODERNIZATION PROCESS

MEASURES OF PROGRESS:

- R&D facility replacement cycle shortened from 138 to 50-year cycle (FY2001).
- Long-Range RDT&E Facility Plans and Investment Strategies approved by DDR&E (FY1992)
- Joint RDT&E Facilities Modernization Committee established and chartered (FY1991).
- Central RDT&E Investment Fund established and capitalized (FY1991).
- Unspecified Minor Construction threshold raised from $1M to $3M (FY1991).
- Local minor construction threshold raised from $200K to $1M (FY1991).
- Use of RDT&E funds for technical facilities up to $3M approved (FY1991).
- The Defense Relocation Account re-established (FY1991).
- The Sell and Replace Program re-established (FY1991).

STATUS:

- USD(A) Action package to implement Long-Range Facility Planning and Corporate Investment Strategies, and to create a Joint RDT&E Facilities Modernization Committee
- and Central RDT&E Investment Fund prepared and ready for formal coordination.

The next chart shows legislative proposals that might be required to help us in our procurement and our facilities. Currently, we do have synopsis requirements up to $100,000 which impede our ability to let some of our research contracts, and we would like to have those requirements waived.

## R&D PROCUREMENT AND CONTRACTING

MEASURES OF PROGRESS:

- Reduction of average Procurement Adminisrative Lead Time (PALT).
- Elimination of Service constraints which go beyond statutory dictates.
- Small purchase threshold increased from $25K to $100K.
- Small purchase competition threshold increased from $2.5K to $25K.
- R&D contracting support personnel co-located at the laboratories.
- Oversight review matched to complexity of business situation.
- Audits/pricing reports replaced with rate checks.
- Automation of R&D procurement and contracting procedures.
- Delegated use of credit cards to S&E's for small purchases.

STATUS:

- R&D contracting workshop held 15-16 May 1990 to inform laboratory contracting specialists, develop base-line data, and prepare draft plans for implementing changes.
- Draft Implementation Plans address how to move contracting support personnel into labs. Shows institutional resistence.
- Individual laboratories requesting authority for locally conceived streamlining.

Again, we want to make it easier to purchase equipment quickly that is not needed by the scientists and engineers, and for this purpose, generally speaking, the experts in the laboratory understand the capabilities of the suppliers of this equipment have the requirement for small business set aside waived. And, as Dr. Herzfeld has

said, it is very important if we are going to refurbish our laboratories to have alternatives to the Military Construction Program—and he will be discussing within the Department—alternatives on how to make funding available over the years to reduce the replacement time which now is over 100 for some of the laboratories. We would like to achieve the university standard which is 20 years to 30 years or, at least get it cut in half to something on the order of 50 years.

That is a very quick summary of the Demonstration Program and we have sent to the Congress a report on this program and the details are covered further in that report.

Senator BINGAMAN. All right. Thank you very much. Before I ask any questions, let me call on Professor Deutch to go through his comments and, again, we will include your full statement in the record.

Thank you for being here.

## STATEMENT OF JOHN M. DEUTCH, PROVOST, MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Mr. DEUTCH. Thank you, Mr. Chairman. I am very pleased to be here and have the opportunity to discuss with you issues bearing on the laboratory system of the Department of Defense. I will only briefly summarize my prepared statement with the understanding that it will appear in the record.

My background in this comes from three different perspectives. First, as you noted, I chaired the 1987 Defense Science Board Study on Technology Base Management. Second, for 4 years, I was with the Department of Energy where I had responsibility for the Department of Energy laboratories. This has given me an opportunity to compare the strengths and weaknesses of the Department of Energy system with the Department of Defense laboratory system. Third, currently in my position at MIT, I am the responsible senior officer for one major Government-owned, contractor-operated laboratory, Lincoln Laboratory, which MIT operates for the Department of Defense. And, I have had a very long-term interest in maintaining the strength of technology-base programs in the Department of Defense.

I think it is exceptionally important in a time of rapidly changing political circumstance and force requirements for the technology base of the Department of Defense and its mission to remain strong. And, evidently, the laboratory program of the Department of Defense is an important aspect of that technology base program. The Department of Defense laboratories actually perform about one-third of the technology base activities and they manage a substantial fraction of the remaining technology base programs of the Department of Defense. It is a serious matter. I am pleased to be one of those individuals who has been concerned with the strengthening of these laboratories as has my friend and colleague, Charlie Herzfeld.

I appear here today as an individual. While I am sitting at this table with distinguished Government officials, I want you to know that I am appearing here as a private citizen and the comments I am offering to you are my own. I have not consulted with my 1987

panel nor with officials in the Department. I am providing you my own judgment on these matters.

As you know, there are two different models in the Department of Defense, the so-called GOCO laboratories and the civil service laboratories, both have a splendid history. But, as has been pointed out by the DSB committee, by Charlie Herzfeld here today and by others, there are certain constraints the Civil service laboratories. They are required to conform to a set of rules that while perhaps appropriate for general Government operation, are not appropriate for the aggressive management of a successful, cutting-edge laboratory.

I do not want to review the strengths and weaknesses of civil service laboratories versus GOCO laboratories. But let me just say there are three essential requirements in my mind for a successful laboratory. There must be a well-defined mission. There must be stable technical leadership of the laboratory which has both the responsibility and the authority to carry out an approved technical program and the flexibility to assign and switch resources within the approved program to meet their technical missions, and, finally, the ability to attract and retain high quality leadership.

In my view the civil service laboratories of the Department of Defense are increasingly facing difficulties in meeting these requirements for a successful technical organization. There is great difficulty with personnel practices and ability to acquire and retain leading technical individuals, especially at the higher ranks. As we enter a period of time there will be increasing retirements from these laboratories that will prove, in my judgment, progressively more difficult to attract high-quality individuals to head the laboratory system.

The technical directors do not have adequate authority, in general. There are exceptions, of course. They do not have the flexibility to make decisions that would be possible in a GOCO laboratory or in a modern industrial laboratory, under best industrial practices. Now, I understand that this committee has, for some period of time, under your leadership Mr. Chairman, attempted to improve the situation for the Department of Defense laboratory and the technical work force in that laboratory.

I am very pleased today to hear both Charlie Herzfeld and George Millburn discuss the progress which has been made on implementing some of the recommendations of the 1987 Defense Science Board Report, especially with this Laboratory Demonstration Program, which is intended to give some of the future a flexibility that our report in 1987 described and which I have summarized for you here.

In my view, I am not sure that it is enough. In my view, the single most important step that could be taken would be for the Department of Defense to convert some of the civil service laboratories to government-owned contractor-operated operations, GOCO operations. I believe that this would lead to more effective performance of defense R&D. And, I believe it should be accompanied by a strong mission statement for explaining why the laboratory is of importance.

I believe that the change would also be very popular with technical staff of the laboratory from the director on down because it is

not true that the technical staff, good scientists and engineers, only work for money. They work because they are in a stimulating technical environment, one which recognizes accomplishments and allows flexibility to respond to new technical opportunities.

In my judgment, in general, again it is not true across-the-board in all instances, GOCO management of these laboratories, Government-owned contractor-operated management, of which there are several different flavors, but that is a second order question, would in fact lead to a much more effective and exciting laboratory system. One which would have greater flexibility, greater flexibility to carry out work for others, greater flexibility to deal with new subjects such as technology transfer. And I am an unapologetic supporter of that notion as an important way of improving the laboratory system.

Now, Mr. Chairman, I am aware that not everybody agrees with that point of view. There are several legitimate concerns that will be raised against it. First of all, it is the case that the laboratories involve themselves in management and in acquisition. To the extent that there is an acquisition function, there is a need to separate a contractor function from that of a Government employee function.

Second, there are those who are concerned that GOCO operations would be more expensive than civil service operations. I do not believe that that has to be the case. I believe that, in fact, if we care about effectiveness of the laboratory as well as cost, that a conversion to Government-owned contractor-operated laboratories would provide the flexibility which would lead to a more successful and efficient and effective technical program.

Third, there are difficult questions about transitions of laboratories from one kind of management to another. For example, pension plan. These have been faced in other cases, for example, by the Department of Energy. And while they are difficult to manage, it can be done. Most importantly, I think, the greatest concern, the greatest criticism of the proposal to convert laboratory from civil service to Government-owned contractor-operated is that the Government officials will lose control over the laboratory, that is service managers, military service managers, the development commands, will lose control over the laboratory.

I have a mixed reaction to that. I do not believe that it is necessarily the case. For example, I believe that both Lincoln Laboratory and the Mitre Corporation in the State of Massachusetts, which I am associated with, both of these, both FRDC laboratories are as responsive to the Air Force as would be an in-house laboratory. In fact, some might say that these laboratories are too responsive to their military sponsors.

My main point, Mr. Chairman, is the vast majority of individuals who have had experience with laboratory systems and laboratory management, I think, would favor a move in the direction from civil service laboratory to a government-owned contractor-operated more industrial-type technical organization because it would lead to greater authority for the lab director, greater flexibility in management practices and compensation, greater utility of facilities, equipment and operating funds to meet a clear mission in technical program.

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I am not proposing, nor do I think it would be reasonable to suggest that there should be immediate and complete conversion to a Government-owned contractor-operated laboratory system. I want to stress that the principal recommendation in the 1987 Defense Science Board Report was that flexibility had to be introduced in the laboratory system to make it a more productive and efficient and consequential technical organization. To the extent that programs such as the Laboratory Demonstration Program can lead to those outcomes, I support them and I think they should be given the greatest support of this committee. And I would urge you to do so.

But, I do also believe that selecting a few, perhaps, on an experimental basis to see how it functions, a few laboratories in the services which are currently under civil service management and converting it to GOCO management would be the single greatest step which could be taken to lead to rejuvenation and an improved performance for the DOD laboratory system. I urge that course of action on the Department and hope that we gain support of this committee.

Thank you very much for your attention.

[The prepared statement of Professor Deutch follows:]

## STATEMENT OF JOHN M. DEUTCH
## PROVOST & KARL COMPTON PROFESSOR OF CHEMISTRY
## MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Mr. Chairman, my name is John Deutch. I am the Provost and Karl T. Compton Professor of Chemistry at MIT. It is a pleasure to appear before you this afternoon to offer some observations on changes which should be considered to strengthen the DoD in-house laboratory system.

My interest in this subject arises from three different perspectives. First, in 1987, I chaired a Defense Science Board summer study on DoD "Technology Base Management". Participation in this study and many others has influenced my views on how the effectiveness and efficiency of the DoD R&D process can be improved. Second, from 1978 to 1980, I served as Director of Energy Research and later as Undersecretary of the Department of Energy. In these capacities, I had responsibility for the DOE laboratories and therefore I have had an opportunity to compare how DoD and DOE manage their laboratory systems. Third, as Provost at MIT, I have responsibility for the Lincoln Laboratory which we manage for the Air Force as an FFRDC. This involvement gives me some familiarity with the problems and opportunities which confront laboratories at the working level. I appear today as a private individual; the views I present do not represent the opinions of the DoD or the Defense Science Board.

While DoD technology base programs [budget categories 6.1, 6.2, and 6.3a] comprise only3% of the the DoD budget, it is widely recognized that technology base activities are crucial to the long term security of the nation. In my view, this is especially true at a time when fundamental political changes are occurring. These changes

may well require vastly different defense forces and systems. For example, there may be an even greater requirement to surveillance and verification systems. Meeting these new requirements will depend on a strong technology base — one which is able to provide the ideas and people responsive to tomorrow's security needs.

The DoD laboratories and technical centers are a central part of the Department's R&D and acquisition activities. The laboratories perform a wide range of functions and they control most the DoD's technology base. For example, in FY '87, the DoD laboratories performed directly about one-third of 6.1 and over 40% of 6.2 research. Much of the remaining technology base program is managed by the labs. Therefore the quality of the laboratories, and their leadership and technical competence is of supreme importance to the effectiveness of the entire technology base activity of the Department.

The DoD laboratory system includes both in-house laboratories/technical centers and contractor operated laboratories, so-called GOCO labs, such as the Lincoln Laboratory. The GOCO labs operated by the DoD function in a manner similar to the national labs (e.g. Los Alamos and Sandia) operated by DOE. The in-house laboratories follow civil service personnel policies and federal procurement regulations and are managed directly within the federal government line organization.

I shall not review here the relative strengths and weaknesses of the Civil Service or GOCO lab management models. These comparisons have been presented in many studies of the DoD lab system. Let me simply stress that there are three requirements for a successful technical organization: (1) a well defined mission, (2) stable technical leadership which has the both the responsibility and

authority to carry out an approved technical program, and (3) the ability to attract and retain high quality technical personnel.

There are examples of both Civil Service and GOCO labs which meet these requirements and therefore function successfully. However, the Civil Service DoD labs are increasingly facing greater difficulties in meeting the requirements for a successful technical organization. For example, both Civil Service personnel policies and salary scales for scientists and engineers compare unfavorably, especially at more senior levels, with standard practice in GOCO laboratories and the private sector. In many DoD in-house laboratories, the technical director (whether civilian or military) does not have a long enough tenure or adequate authority to determine program content or assure program execution. The technical director in a Civil Service lab will also not have the flexibility, which is found in a GOCO or industry laboratory, to make allocations within approved budgets among the categories of equipment, people, and facilities.

In order to correct these shortcomings, it is necessary to introduce fundamental and far-reaching changes into the present practices for managing in-house laboratories: greater flexibility for the management of all science and engineering personnel, with simplified procedures for direct hire, promotion and removal; improved procurement practices; and more local authority over the execution of approved technical programs. I am aware, Mr. Chairman, that this subcommittee has taken a leadership role in advocating such changes. But I fear that these changes are taking place too slowly and not leading to the greater productivity and efficiency that should be expected from the DoD laboratories.

In my view, the single most important measure that

should be adopted to improve the performance of the DoD in-house laboratory system is to convert these laboratories from Civil Service to GOCO operations. I believe that this step would very quickly make the laboratories more effective performers of defense R&D, because it would permit the establishment of a technical environment more conducive to high quality work, on a management basis that has proven its effectiveness in both the private sector and with GOCO labs. If this change was accompanied by a clear statement of the mission and importance of the laboratories, then I believe the change would quickly gain the support of the technical staff.

The GOCO management structure also has advantages for other purposes, such as encouraging technology transfer and permitting the laboratory to work for other sponsors than the DoD. A change to a GOCO management structure would not necessarily require cost increases; indeed the GOCO structure provides much greater flexibility in responding to changes in demand than a Civil Service system which by its very nature requires that first priority be given to keeping the existing people in existing jobs. It may be particularly attractive to introduce such a major structural change at a time when every part of the defense establishment will be expected to get smaller.

Mr. Chairman, I am aware that there are several legitimate concerns with the proposal to convert the Civil Service DoD labs to GOCO labs. First, it will be correctly argued that many DoD in-house laboratories/technical centers are involved with both R&D and acquisition. The acquisition functions must ultimately be the responsibility of the government, not of the contractor, employees so that conversion to GOCO management would not be appropriate. I believe that GOCO conversion is particularly important for those labs which are principally devoted to the direct technical performance of R&D, for example, the Naval Research Laboratory, rather than for

those labs/technical centers which are heavily involved in acquisition functions such as the technical management of R&D contracts performed by others. Second, some are concerned that GOCO laboratories will turn out to be more expensive than Civil Service laboratories. As I have mentioned above, I do not believe this to be the case, especially if one takes into account the greater efficiency that the GOCO operation allows. Third, there are difficult questions about how the transition from Civil Service to GOCO operation would be handled, for example, in the area of pension rights. These question remain to be addressed, although the federal government has had some experience in converting laboratories.

Finally, there is widespread concern within the R&D service commands that GOCO conversion would inevitably lead to a lessening of control of service and civilian government officials over the direction and programs of the laboratory. I believe this concern to be largely misplaced. It has been my experience that GOCO laboratories, even when operated by strong and independent organizations, remain remarkably responsive to their sponsor's interests (some might say too responsive). In my view, Lincoln Laboratory or the Mitre Corporation are as responsive to Air Force needs as are Eglin and Kirtland -- and the GOCO organizations may have greater capability to meet many Air Force needs.

Mr. Chairman, I dare say that the vast majority of individuals who are knowledgeable about the DoD laboratory system, many with the experience which comes from occupying positions of responsibility within the DoD R&D structure, would agree that a move to greater reliance on GOCO management would lead to a more effective and efficient defense technology base. I urge you and your Subcommittee to support this innovation in the management of the

DoD technology base. Immediate and complete conversion should not be the goal. The first step is for the the Office of the Secretary of Defense to work with each Service to identify a few lead laboratories where the benefits of conversion to GOCO management are judged to be the greatest and proceed to introduce change. The experience which is gained with this first set of laboratories should influence decisions on the pace and extent of conversion to GOCO operation of other in-house DoD laboratories and technical centers.x

Senator BINGAMAN. Thank you very much. Let me ask—starting with that issue which you have described very clearly and persuasively—Dr. Herzfeld, what is your reaction to the suggestion that we should take some of the laboratories in the DOD system and transfer those or shift those over to be GOCO labs? I think what we have done so far and what is described here in this Demonstration Program is very much an incrementalist kind of approach to solving the problem—we are going to change this set of regulations. We are going to loosen this up. We are going to try to find an exemption to the MILCON requirements. We are doing a lot of things that may be, on the margin, improvements.

But, I think the threshold question that Professor Deutch addresses which is, why do you not just sidestep it all and, at least with some of your labs, shift them over to GOCOs? I would be interested in your reaction.

Dr. HERZFELD. My answer is about as complex as the issue here, sir. I always value my colleagues' advice and suggestions. I have always found them very helpful, including this one. I agree with the fact that we should start thinking seriously about this approach for some of the laboratories. Part of the technology strategy effort which I have mentioned to this committee before and which is going on now, will consider this very carefully. So, there is no basic disagreement on the desirability of trying it out and looking at it seriously. No question, at all.

There are a couple of observations, I think, that are important. The GOCOs are not necessarily all equally successful. In DOD, we tend to call them Federally Funded Research and Development Center (FFRDCs) and Mr. Deutch knows the difference as well. In FFRDCs there is quite a spectrum of quality there, as well, that has to do with who their customer is and how much he helps or hinders. It has to do with the leadership of the organization. It has to do with the board of directors who are with the organization that really owns the institution, and many other factors. So, it is not a panacea. That is one point. But it can lead to true outstanding quality, such as the Lincoln Laboratory, which I consider at the same level as the National Laboratories of DOE as the best laboratories in the country.

The second caveat, which I need to introduce is DOD, after a number of reorganizations and rethinkings of what our job is, has

wound up with very few organizations that are real laboratories. Almost every one of the institutions that are called laboratories should be called R&D technology centers. They do engineering. They do some procurement. It is very important that that, in fact, has many advantages. One cannot have it both ways, I believe, unfortunately; one cannot have an environment which is on the one hand decoupled from everyday life of the military departments and is a good laboratory, and, at the same time have the operative of this laboratory flow smoothly into the acquisition process and out into the field.

I think you can do all these things better than we are. We are addressing that issue now. But, there are some real problems.

To make this more vivid, I would like to show one viewgraph here which describes the current structure more carefully than has usually been done. This is from our study about the laboratory restructuring effort which is going on in parallel with this. It is a complicated chart. It has really two functions. One is to show that each sub is different and it is not surprising nor is it disheartening to me, because we like to have a difference. The other is that almost every organization involves different organizations within the service, for example in the labs, the RDECs, the Commands, and the depots. Also, all of the organizations spend different kinds of money. There is R&D money, development money, production money, and there is support to field the systems, which is O&M. The reason for that is, it has evolved this way in order to facilitate the interdiction of the best technology as quickly as possible.

There are lots of things wrong with this system and we are addressing them. We will be coming to you with a report, when we have it finished, as to our proposal on how to proceed. We are prepared to make major changes in this enormous system. The minimum figures that we can get together list some 90,000 employees, and some $14 or $15 billion of money either spent in this organization or through these organizations to contractors.

The problem I see in converting some part of this into a GOCO is, I do not know where to stop. I do not know how far to go to the right on this chart toward the applications without running into the problem that you will have next door in the same office, two or three people doing substantially similar things, technical things, one or two will be paid and managed on a GOCO scheme and one or two will be managed and paid through the civil service scheme. I do not say, on the other hand, how the government would wish to give up its responsibility and efforts needed to execute the functions that are further along the spectrum of activities. So, I think there is a conceptual problem here.

Senator BINGAMAN. You are saying the contracting activity, the acquisition procurement activities, need to remain in-house in the government and that they are surgically tied up with the R&D activities going on at these labs. That there is great difficulty——

Dr. HERZFELD. In drawing a boundary, yes. Also, a good deal of the R&D that goes on in the service, the R&D money goes through these places. There are inefficiencies in this because we have R&D people who are civil servants watching the performance of the contracts and not doing R&D. This is one of the things that John was correctly pointing out as an inefficiency. So, we are trying to strug-

gle with the whole issue here. I just would need everyone's help and advice to see how we would work it out.

Senator BINGAMAN. Let me ask Professor Deutch to give his reaction as to how we deal with that problem?

Mr. DEUTCH. Well, I am touched by this whole session. We all jointly have the same objective. I think that Charlie has gone as far as one can expect by his saying he thinks trying a few test cases of converting makes sense. That is all I would really hope to hear from him today.

But, let me make a specific remark about the problem, of untangling acquisition and research and development. Mr. Chairman, I have three reactions to that.

First of all, if something is not done to improve the technical performance of some of these laboratories, the good quality individuals will not remain in them; the good quality individuals will not be available to be recruited in the future. The labs will progressively deteriorate. So, doing nothing, keeping the current system, is simply not satisfactory.

Second, I would note that there are other government agencies, for example, the Department of Energy, which have managed to untangle this continuum between development and acquisition, and have done so through a variety of mechanisms which work, I think, on balance, fairly successfully. Now, it does depend upon the specific case one is talking about—how easy or how hard it is to separate these functions. Third, and most importantly, I am here today to talk about the technology base. I am here today to talk about the technology base which is the future strength of the Department of Defense.

That means the categories on Charlie's chart—we are talking about are basic research and exploratory development. If we get these laboratories and technical centers too intertwined with the acquisition process, you are going to lose the talent and the technical focus that I believe some of these laboratories should have in research and development. The difficulties that he points to is also an impairment of carrying out really first class R&D. I think it is out of balance and it could be well moved back toward more technology-based activities by the laboratories through the GOCO mechanism.

Senator BINGAMAN. Let me go on to a slightly different question here. You have the restructuring study going on in the labs. We have got the Lab Demonstration Program which is going on. We have got Professor Deutch's recommendation here that you consider taking some of these labs that have a strong technology base and taking them out of the in-house system and making them free standing.

It seems as though if all of those three are going to be pursued, the logical thing would be to pursue them jointly or simultaneously and not wind up with structuring the labs and then coming back and deciding which ones, if any, should become GOCOs. And then later, doing the other. Are you able to get your arms around all aspects of that or have we wound up loading the Department down with too many activities at once?

Dr. HERZFELD. Not really, Mr. Chairman. I think we are beginning to unravel how to do this. It is a complex task. I will show a

viewgraph which I made up yesterday struggling with what I knew I was going to be asked—how these different activities went together. I must apologize for my free-hand engineering drawing and lettering. It has been a while since I have done this.

Again, the spectrum of activities which are logistic training and production and our technology strategy at the bottom has to do with all of these activities and must. It is at this level that we will surely examine the function of GOCOs and FFRDCs and the process.

On this we had a very successful first meeting at the end of last month. We are still digesting the output. The output was a good deal richer than we expected, but good. We will continue to work with this. I expect that a month or two after the summer, studying the Defense Science Board which is largely devoted to working on different technology strategy, we will be in a position to report at that time where we come out.

In the meantime, we will have some internal papers, some of which we will be able to share with you, at least informally. The Defense Critical Technology Study which we briefed to you recently, addresses one important item that Dr. Deutch mentioned and that has to do with the mission of the laboratories. The critical technologies are very helpful in focusing the technical missions of the tech-based activities of these institutions. We will be able to use this technique increasingly, as the years go on, to focus things.

Senator BINGAMAN. The idea being that you would try to move more towards having specific laboratories which concentrate on the specifics of those technologies rather than have everybody do everything?

Dr. HERZFELD. That is entirely correct. Now, there is some of this going on, but we can sharpen it a good deal and we plan to. The Laboratory Restructuring Study is really whether rubber hits the road, as one says. It is here where we are trying to sort through this complicated diagram of activities that I have mentioned to you.

The services are concerned about their interests not being regarded carefully enough. We are concerned that we get a meaningful DOD-wide strategy together for these organizations. We would like to rationalize and simplify the management. We want to introduce the approaches and the laboratory demonstration plan to all of them where they apply, and do so quickly.

We are in the process of sorting this out. So, I think we will understand it, but I do not wish to give the answers on this. It is too complicated, too serious. But, we are working very hard and we are trying to be very thoughtful about it. The inputs we have been getting have been very helpful.

Senator BINGAMAN. Let me ask on the Demonstration Program that was suggested by the Science Board and, then, also by those here in the Congress, why are we doing this as a demonstration program? In all the specifics that Dr. Millburn went through, I know there is always the idea of let's work on it a while, and if it works, then we will come back and go ahead and apply it to others.

My experience, in the short time I have been around here, is that the people change so fast in the Department of Defense that those things that are started as demonstration projects, you seldom

have the same people around to do anything more with it. Maybe that is an unfair comment, but, why don't you, if you come up with a series of useful reforms, why don't you apply it to the whole system?

Dr. HERZFELD. Well, first of all, I am in sympathy with your point about the change of people. I hope I will be here long enough to work on this for a while, but no one can ever tell. I believe the real reason is that starting with 25 percent of the population is already a pretty big experiment. If it at all looks like it has succeeded—and I think we should know that within a matter of 6 months or so—it would then be very easy to say, here are the rest of the institutions that will be coming on board. I do not think it is a lot of time that is at issue.

What is at issue is really kind of feeling our way a little bit in the early stages—asking the Tim Coffeys of the world, is this thing really working the way he wanted it, or have we missed something? Have we made some other ghastly mistake which is easy enough to do, where we meant to do good and really messed up something. Is it totally all right? I would rather do that with 25 percent of the population than with 100 percent. That is all.

Senator BINGAMAN. Let me ask also of the time frame for this. As you know, the legislative needs that you would have in the way of changes in the law that would be required, there is only one opportunity to get that done each year, that is, in the Defense Bill that would be marked up around here 4 to 6 weeks from now. How much of what is going to be needed is going to be marked up this June, and how much of it is going to have to wait until next June? That sort of focuses the time question. If we do not get it done in the fairly near future, it will be next June before our committee, at least, considers it, unless somebody else is able to.

Dr. HERZFELD. I'm not sure what the answer is. I'm not sure where we stand. Perhaps Dr. Millburn does.

Dr. MILLBURN. We are still debating this in the Department. This will be a legislative package that comes over to the Congress, so I would not comment at this time on just what we would do. I might say, it is my personal opinion, in another year we will be addressing this problem. We must make certain that we do it in a measured sense on how we are going to accomplish this. It is very, very complicated.

Dr. HERZFELD. I think your question, though, has helped me with my priorities because I now understand that I have to push this more than I thought before to try to make sure that it goes into this June markup.

Senator BINGAMAN. As I say, we are still likely to be here next June, but there is an extra year of lag time in there, and that is another reason why pursuing it as a demonstration project obviously has some drawbacks.

Dr. HERZFELD. But you know, Mr. Chairman, there are a remarkable number of things we can do without legislative relief, and we should continue to do those, and that would make a big difference.

Senator BINGAMAN. Let me ask on the Air Force, the list that you attach of demonstration laboratories, I think it is attached to your testimony here, it lists quite a number of Navy laboratories, quite a number of Army laboratories, and only two Air Force lab-

oratories, unless I am misreading it. Is there a reason why we have less attention to this demonstration program in the Air Force?

Dr. HERZFELD. I suggest Dr. Millburn answer this.

Dr. MILLBURN. The primary reason sir, is there are fewer laboratories in the Air Force. The Air Force has the smallest number of laboratories of the three services, so the ones that are being used in the demonstration program is a large fraction of the laboratories within the Air Force.

Senator BINGAMAN. Am I also right that the Air Force has substantially more concentration of military personnel in key positions in the laboratories rather than civilian?

Dr. MILLBURN. Yes.

Senator BINGAMAN. Is that not a problem with the suggestion you have for stabilizing the management of these laboratories? It seemed to me that having uniformed personnel in key positions of these laboratories tends to build in turnover—which is directly contrary to the stability that you are talking about trying to instill, and Professor Deutch is indicating you can achieve with the GOCO-type of operation.

Dr. HERZFELD. I think that is basically right, but here, too, we can make significant improvements. As you know, we are trying to make the tour of program managers in uniform longer than it has been for stability reasons, exactly as you explained. And that is going to happen on the acquisition side. I see no reason why we cannot do something similar with the technical folks in the Air Force who are in uniform.

Senator BINGAMAN. Would it not also be advisable to move the Air Force toward greater concentration of civilians in these laboratories to deal with this problem?

Dr. HERZFELD. One of the processes is you have a lot of Air Force officers who have had a lot of technical experience, and that is good. I am not really sure; I cannot answer that with any conviction either way.

Senator BINGAMAN. Mr. Deutch, did you have thoughts on that?

Mr. DEUTCH. Yes, Mr. Chairman, I do. I favor military service individuals having very, very first-class scientific and engineering professional experience. So in fact, to the extent that it would encourage the Air Force or the Navy, and the Army to have their officers trained so that they really care about a quality, technical research career in one of their laboratories, I think that is a very important thing to do. I believe that we are less good at that than we were 20 years ago, that the number of officers who are going into nuclear in the Navy, the number of Air Force officers who are really first class in nuclear weapons programs, special weapons programs, is not as good as it used to be, so I would not make a distinction based on whether an individual was in uniform or without.

I favor having some of the officers in the military services educated, motivated, rewarded to have high quality technical professional careers and proceed onward to flag rank and become heads of their service or what have you.

Dr. HERZFELD. If I may add, I think that is really where the pressure point is, and I plan to exert that as feasible. We must stay away from the notion that the assignment of a military person to

be a commander or director of a laboratory is a permanent assignment. I do not know yet quite how to achieve this, but what we should do is make it so that only people who are good prospects for promotion to flag rank are appointed to such positions.

Once we make that change, then we have a career path open. So, it is the analogue of the dual ladder for the technical folks, the military technical folks need a dual ladder also, so they have somewhere to go in their career.

Mr. DEUTCH. Mr. Chairman, to come back to the particular case in the Air Force, I think that the Air Force have used their laboratories in a very different way than the Army or the Navy, and my own judgment is that the Air Force does not place as much value as it should on actually doing the highest quality technical cutting edge work in some of their laboratories. They use much more development laboratories in general, than the Army and Navy, but I do not think that is a question about whether there are too many officers or too many uniformed people in the laboratories.

Senator BINGAMAN. Let me ask about the question of what role these laboratories can or do or should play in trying to assist U.S. industry to upgrade manufacturing and essentially become more competitive. I know that the buzz word around the country these days is competitiveness. Is it unrealistic to think that DOD labs could play a significant role in taking that on? I am not talking just about maintaining strong technology base for defense purposes. I am talking about having outreach programs where they try to work with industry that may or may not have contracts directly with the services to upgrade manufacture.

We have very little in the way of manufacturing extension programs in our country compared to a lot of industrialized countries. Is this something that makes sense for DOD labs or not? Would any of you like to comment?

Dr. HERZFELD. I think there is more we could do. There are some cautionary notes to be observed. In my experience, the government in general, the laboratories and government, do not really understand commercial industry at all: how it works, why it works, how one works, when it works mainly with a profit motive. It is very alien to in-house laboratories; even to some very good GOCOs.

I worked with one that I would prefer not to identify, when I was in the investment business where we tried to get with the agreement of the laboratory, its director and the university that operated it—not yours, by the way, John—to see whether there were some ideas in the laboratory that could be picked up by venture capital and applied in business-building way. I found that the people in the lab, and it is one of the best in the country, were so unable to think about the possibility that they were possibly involved in that themselves, that they would cut loose from the environment they were in and go out to the risky, competitive, commercial world, that nothing ever came of it.

So it is not as easy as it sounds. Should we do something more? Absolutely, but I really do not know yet how, and I hope you will keep reminding me to think about it. I just do not know how yet.

Senator BINGAMAN. I will just comment and call on Professor Deutch. The Secretary of Energy, Admiral Watkins, is making a major effort to get the DOE labs more aggressively pursuing this

kind of activity and involved in it, and I think with some success. Obviously, the effort is not that mature yet, but I think they are certainly pursuing it in a much more aggressive way than I think DOD has yet considered pursuing it, and I would be anxious to see if something could be done. Professor Deutch.

Mr. DEUTCH. Thank you, Mr. Chairman. Let me say that I will try to avoid the word competitiveness, because when you talk about the Government labs, because it seems to raise all sorts of religious questions about the government role. Let me just talk about technology transfer for a moment, which I think is very important indeed.

The laboratories, whether they are GOCO or civil service laboratories, are enormous technology engines, and I think it is very important that we work on how to transfer that technology to the private sector. In the case of the Department of Defense, there are two kind of clients. One is the defense industry itself, and second, one is the larger commercial sector.

The GOCO arrangement has an enormous amount of advantage in that process of technology transfer, not that they are perfect, and certainly I would agree with Charlie that the laboratory system or R&D laboratories are not going to solve the problems of industrial productivity in this country. But if they are organized on a GOCO basis, there is the opportunity for a lot more flexible mechanisms and arrangements between the laboratory as we see in the Department of Energy and private industry.

For example, there is the prospect of exchange of people within the company or the organization that runs the laboratory. Now, that is an indirect way of transferring technology. It is an indirect way of having an effect on productivity, but a very important one. When DuPont, to take a neutral example, when DuPont used to run Savannah River, the exchange of engineering personnel, between the people, not in terms of money or projects, but people, had an effect on the engineering quality throughout DuPont.

Let me say that Sandia and Bell Labs have had that same relationship, with people exchanging back and forth. So that is an important way to accomplish the public good of having technology innovation transfer elsewhere in the economy, and one which I think is very important to the discussions we are having here now. There is a lot of technology in those laboratories. Not all of them are important to the private sector, but we should be forced to—at least putting it on the shelf for people to look at.

Senator BINGAMAN. We have, as you know, passed several laws in recent years to try to facilitate that tech transfer, particularly in the area of the Department of Energy Labs, but do you know of significant legislative obstacles that we need to address to accomplish this same kind of tech transfer with DOD in-house labs, or in other GOCO labs?

Mr. DEUTCH. I have not looked at the legislative impediments and legal impediments in any detail for the Department of Defense, but let me quickly say that I believe if one did look at those problems in detail that one would find that 70 percent of the problem is practice, rather than legal inhibition. And therefore, I would say that what you should focus on first is incentives and practice for technology transfer, in contrast with one law changing it. If you

do not have the right to practice and place them, then it is not going to make a difference.

Dr. MILLBURN. Mr. Chairman, I would like to comment that there have been significant changes in the law in the last few years, and so now the number of cooperative research and development agreements between industry and the laboratories in the DOD are now increasing. I think we will see that look up, and the law which makes it possible now for researchers and the Department of Defense laboratories who make inventions to share in the royalties is another example that I think we are now splitting up much better. I think we will see continuing growth in those two areas. There is still room for improvements.

Mr. DEUTCH. Whether it was DOD labs where we have taken some initiatives on commercialization or technology transfer, the type that Charlie is describing, let me tell you, at the practical level, it still remains fairly difficult to do, but I think it is because of practice, not because of specific legal prohibitions, but we will manage it.

Senator BINGAMAN. Let me ask one final question. I have a variety of questions, but let me finally ask about the same basic question with regard to outreach to support science and engineering education from these laboratories. We had a hearing here a couple of weeks ago on what the Department of Defense is doing in connection to supporting science and engineering education, and again, I think that there are some examples. We are going to hear some on the next panel talk about some of the specifics, but to what extent is the Department of Defense, as a matter of policy, urging these DOD laboratories to pursue outreach educational activities, in support of educational institutions, out of their laboratory system to build the science and engineering personnel that we need in the country?

Dr. HERZFELD. On your specific question, how much are we doing to encourage the labs, my answer is, probably not enough, and I think we will do more as time goes on. There are other things that we are planning to do, however. We are getting ready to increase the number of fellowships at universities supported by DOD R&D quite significantly.

In another dimension, I started discussions with Dr. Bromley in the context of his Federal Council on Science and Technology. He has a panel, college level education, and we will be working with that. And he has a panel on science, engineering and mathematics, which is chaired by Eric Bloch, and is vice chaired by myself, and we will take up in that forum what all parts of the Federal Government, including the Defense Department, need to do to assure the base of well-trained young people who are coming on line, and we will meet through the next century.

So, there is some very deep and long-range thinking going on, and I am just not ready to give you very specific answers yet. After all, you only confirmed me a few months ago.

Senator BINGAMAN. We have requested, and this is on a different subject than we have been talking about, but we have requested, I believe in writing, that you help us by identifying, Dr. Herzfeld, the significant program elements of the services' budget request that will lead to these 20 critical technologies so that we could un-

derstand what the level of funding was going to those areas, and to date, we have not received that. In fact, we have gotten some indication that this is going to be impossible to generate. Do you have anything to report on that, as to whether that information is forthcoming?

Dr. HERZFELD. It is turning out to be much more difficult than I thought it would be when I made my promise. I think Dr. Millburn should address the details, because he and his people have been looking into it for me. I think we will do better. I think it turns out that it will be really tough to do, because the service budgets are structured in ways that are not quite compatible with this particular way of looking at the 6.1, 6.2, and 3(a).

Now, we will want to change that, and I am very much on the same wavelength as you and the Committee are, but I do not think it will be very easy to do for the kind of reasons Dr. Deutch mentioned. We are in a mode of operating that makes it hard. There is nothing that says it has to be that way, it just is that way. I think George has some more to offer.

Dr. MILLBURN. Yes, Mr. Chairman. We are attempting to reconstruct the funding of the critical elements. It is turning out to be very, very difficult and perhaps even impossible to do it, certainly in any sort of audit sense. The funding estimates are just estimates, since the budgeting structure is not conducive to easily identifying the funds that go into each of the 20 technologies. We are still addressing the problem. It will be easier next year when we start from scratch again, to do the whole budget exercise. But I do not know that I could be optimistic that we would be able to do a job that would be, in my judgment, worthy of sending over to you. But we are still working with it and trying to get the details.

Dr. HERZFELD. Let me add a point on this if I may. I had a meeting with the three assistant secretaries of the services last Friday, and some of the key military people, and we talked mostly about the laboratory restructuring, which of course, they are very interested in. We formed, with the okay of Mr. Atwood, an executive committee, which I chaired and which consisted of the other people I mentioned, for this restructuring effort.

While in some ways our meeting was complicated and inconclusive, as a first meeting of this kind is almost always likely to be, we did make some outstanding progress in a couple of things, and one of them was the very issue you raised.

I have told each of them that we will need to make sure that more resources are directed at the critical technologies, including some service-specific ones, which may not make the top 20 in the DOD list, and they all agree that this needs to be done. So, I expect we will get cooperation.

I think Dr. Millburn is right. Fiscal year 1992 will probably be the first time that we can nail this down in some significant way, but we will do much better in the execution of 1991 than we have.

Senator BINGAMAN. My concern is, obviously, for us here in the Congress to perform any kind of oversight that has any meaning at all, we have to have some ability to look at what the budget numbers are in these areas, and if it is impossible to ever extract that, then perhaps we need to direct a different way of preparing budg-

ets so that we can get information that allows us to properly oversee what is happening.

Dr. HERZFELD. I do not think it will be necessary to go that route. I think we will be able to come up with a procedure that will make it easy for you to see what is going on, because obviously, you need to do that. It is just that we are not there yet.

Senator BINGAMAN. Thank you all very much. This has been useful testimony. We appreciate you being here. Let us go on to the second panel.

Dr. HERZFELD. Before I leave, I would like to thank Dr. Heeb, who has directed a great deal of the work and has a critical role to play in all of this, and he is associated with Dr. Millburn, and I thought he should be recognized by the chair.

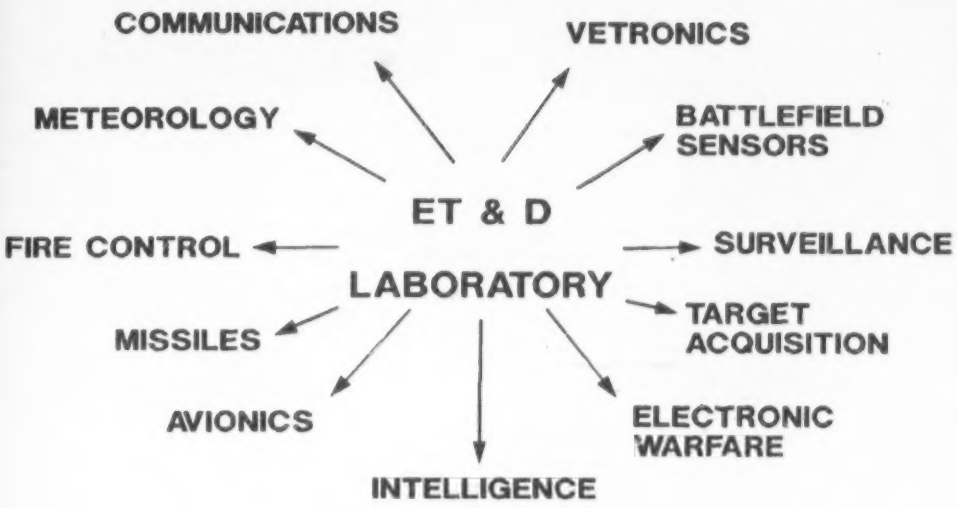
Senator BINGAMAN. Thank you very much. All right. Why don't we go ahead.

Dr. Thornton, please start, and then we will just go right on across from the right to the left there, or left to

## STATEMENT OF CLARENCE G. THORNTON, DIRECTOR, ELECTRONICS TECHNOLOGY AND DEVICES LABORATORY, U.S. ARMY LABORATORY COMMAND

Dr. THORNTON. Thank you, Senator. As you know, I have already submitted written text on the Electronics Technology and Devices Laboratory. This is one of the seven laboratories that make up the Laboratory Command (LABCOM) that is headquartered in Adelphi, Maryland. We are located at Fort Monmouth, New Jersey.

LABCOM, as an entity, is one of the DOD laboratory demonstration projects, and many of the things that are planned to be accomplished in the demonstration projects, we have experimented with in our laboratory. I think the laboratory demonstration project is going to accomplish a great deal by making it possible for Army laboratories to expand their negotiating rights with their landlords at various locations, and with their service policy maintains such that they will begin to reap the same kind of benefits that we have demonstrationnstrated.

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To set the stage, our laboratory works on devices and components. We develop nearly 85 percent of all the electronic components that go into Army electronic systems and into DOD systems, as I will mention a little later on. The particular importance of this, is that we work at that point in the technology food chain where you transition from the basic physics and the basic understanding of the materials into a realizable entity that performs a function, the building blocks or the enabling technology elements that allow our systems to perform as planned. The technologies that I have listed here are the ones in which we have significant efforts at the present time.

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- HI ENERGY BATTERIES
- PULSE POWER

Just a word about how we choose the technologies, and how we shift our funds to emphasize them. The Army has evolved a process that may have been explained to you in the past, where we take emerging technologies, such as I have shown. We then work with our training and doctrine people, with the soldiers themselves, with our development centers, and we hypothesize what future systems that we are going to need to fight effectively with in the next century.

Then we take those systems and we play war games with them, and evaluate the relative importance of the technologies in terms of how effective the systems are in the various kinds of war games that we play. I, myself, have served as a brigade commander, for example, in these games that help us make technology decisions.

## *FUTURE SYSTEM TECHNOLOGY REQUIREMENTS*

| TECHNOLOGY \ FUTURE SYSTEM | INFORMATION TRANSPORT SYSTEM | INTEGRATED METEOROLOGICAL SYSTEM | INFORMATION COLLECTION SYSTEM | INFORMATION DENIAL SYSTEM | FAAD COMMAND & CONTROL | AIR DEFENSE WEAPON SYSTEM | PATRIOT 2000 | FUTURE ATTACK ROTOCRAFT | LIGHT HELICOPTER EXPERIMENTAL | FUTURE UNMANNED AERIAL VEHICLE | ELEC ENERGY ASSAULT SYSTEM | UNMANNED GROUND VEHICLE | BLOCK III TANK | BREACHER/CLEARER | ROBOTIC SMART MINE FIELD | NLOS FOG-M | ADVANCED FIELD ARTILLERY SYSTEM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MICROELECTRONICS, PHOTONICS | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| DISPLAYS | X | | | | X | X | X | X | X | X | X | X | | | X | X | X |
| MMW/MW | X | X | X | X | X | X | X | X | X | X | | X | X | X | X | X | |
| FREQUECY CONTROL, ACOUSTICS | | | X | X | | | | | X | X | X | | | | | | |
| PULSE POWER | X | | | X | | | | X | | | X | | X | X | X | X | X |
| TACTICAL POWER SOURCES | X | X | | | | | | X | | | X | X | | | X | X | X |

If we look at the Xs this chart, what that refers to is that there are technology show stoppers in the planned development of every one of those future systems corresponding to specific electron device technologies that we are working on.

## *ELECTRONICS TECHNOLOGY and DEVICES LABORATORY*

US ARMY LABORATORY COMMAND

ELECTRONICS TECHNOLOGY and DEVICES LABORATORY

- PROVIDES THE SOLDIER WITH THE EQUIPMENT TO FIGHT AND WIN BY INSERTING NEW TECHNOLOGY INTO ARMY SYSTEMS THROUGH CONTINUING JOINT DEVELOPMENT WITH R&D CENTERS, LABORATORIES, AND PROJECT MANAGERS
- SERVES AS A STEWARD OF THE NATIONS (WORLD'S) RESOURCES TO MEET THE NEEDS OF THE SOLDIER
- SERVES AS A NATIONAL CENTER FOR ELECTRONIC COMPONENT RESEARCH WITH ON-SITE UNIVERSITY & INDUSTRY PARTICIPATION
- HAS GENUINE CONCERN FOR ALL EMPLOYEES TOGETHER WITH THE HIGHEST LEVELS OF MOTIVATION FOR PERFORMANCE CONSISTENT WITH FAIR, HONEST, AND OBJECTIVE PERSONNEL MANAGEMENT

The four bullets on the next viewgraph, the uppermost one is pretty straightforward. Our job is to get that technology into the

systems that will have a positive impact for the soldier. If we do not do that, we are not being successful.

A second bullet is one that I would like to comment on though, because it represents a cultural change in the laboratory over the last 5 years or so. Essentially all of the scientists and engineers have begun to view themselves as having a different role than they had in the past. Five years or more ago we took our budget, broke it down, and gave the engineer a given amount of money to pursue a given task. He awarded a contract to a contractor, received the report, and obtained a result.

Today, basically, as part of the Laboratory creed, we look at what we are trying to accomplish in a given area of technology and its implementation. We then break that down into the critical subelements in which we have to be successful. We then look at all the technology that is going on throughout the Nation and much of the technology that is going on throughout the entire world.

We take those things that we can do best, and we marry them up through teaming efforts with programs in universities throughout the country and throughout the world, with industry, and with other government entities, that are already ongoing with other people's money. Those efforts are put together to get the result that is intended. That is essentially what we mean when we say we became stewards of that technology to realize benefits for the soldier.

We have to do that, because there is no way we can have the dollars and other resources within our own organization that are required to independently develop the technology and get the results we are after.

No one is going to let us do that unless we are a peer, equivalent laboratory with recognized expertise. We must first earn the medal to allow us to show that kind of leadership.

*FY89*
*A YEAR OF EXCEPTIONAL*
*TECHNICAL ACHIEVEMENT*

US ARMY
LABORATORY COMMAND

ELECTRONICS TECHNOLOGY and DEVICES LABORATORY

- **61 SIGNIFICANT ACCOMPLISHMENTS IMPACTING OVER 100 SYSTEM/EQUIPMENT APPLICATIONS - 13 ARMY MISSION AREAS, SDC & SDIO**
- **30 PRODUCTS TRANSITIONED TO SYSTEM DEVELOPERS AND INDUSTRY**
- **OVER 100 TECHNOLOGY TRANSFERS TO INDUSTRY AND UNIVERSITIES**
- **OVER 350 SIGNIFICANT ENGINEERING SUPPORT ACTIONS TO OTHER LABS/CENTERS/PM's/AGENCIES**
- **55 ISSUED PATENTS (30% OF ARMY TOTAL)**

By standards that we have set up and that have been set up by the Army, our laboratory has been a successful laboratory. Each year, we complete some 40 to 60 significant accomplishments—that is, a significant engineering or research achievement, and that includes the development of about 30 individual products that are then transitioned. I have to explain what we mean by transitioned. If we went back many years ago and did an R&D project for one of our user commands, we would give them the reports, and maybe demonstrationnstrate a component and hope that they would use it.

Today, virtually every technology development in the laboratory has a transition plan already embedded in it, almost from the day the project is born. That means there has to be a transition mechanism in place by which that technology will benefit all of the DOD projects, and certain targeted projects. And if we look at how we

transition, our products are already designed to go directly into industry-developed test beds, and into government industry demonstrationnstrations as part of systems which are under development.

Right now, we have some 60 products in the development chain. Each of them has an identified responsible person. There is also an identified person, in industry or the developing command, who is going to receive it, and the specific way in which that technology is going to be tested and evaluated, who is already in place. That methodology has been the key to achieving a successful technology transfer.

***TRI-SERVICE***
***DOD COORDINATED PROGRAM***
***IN ELECTRON DEVICES***

US ARMY
LABORATORY COMMAND

ELECTRONICS TECHNOLOGY and DEVICES LABORATORY

- **DOD ADVISORY GROUP ON ELECTRON DEVICES (AGED)**

  **DOD / ARMY / NAVY / AIR FORCE / INDUSTRY**

- **WORKING GROUPS**

  **A. MICROWAVES**
  **B. MICROELECTRONICS**
  **C. ELECTRO-OPTICS**
  **D. PRODUCTION**

- **VERY HIGH SPEED INTEGRATED CIRCUIT PROGRAM (VHSIC)**

- **MICROWAVE/MILLIMETER WAVE MONOLILTHIC INTEGRATED CIRCUITS (MIMIC)**

Our electronics mission program is actually a tri-service project. It is possibly the most jointly operated mission program among the services and has been in place for many years. The DOD Advisory Group on Electronic Devices (AGEDs), which is a group of industry executives, government executives, scientists and engineers on both sides who sit down and evaluate, literally, all of the in-house projects in the Army, Navy and Air Force, plan joint strategy, look at every contractual obligation that we are going to proceed with, strategy, and then coordinate those efforts. So, it is a true DOD Tri-service program.

We have two additional examples of DOD/Tri-service joint effort, the VHSIC program and the MIMIC program, where we have had a DOD director, an Army director, a Navy director, and an Air Force director working together to run those programs on a week-by-week, day-to-day basis.

## ACCOMPLISHMENT HIGHLIGHTS

US ARMY LABORATORY COMMAND

ELECTRONICS TECHNOLOGY and DEVICES LABORATORY

- MICROELECTRONICS/NANOELECTRONICS "ATOMIC SIZE" DEVICES
- GaAs "SUPERLATTICE" INFRARED DETECTORS
- ULTRA STABLE FREQUENCY SOURCES
- HI ENERGY-PRODUCT MAGNETIC MATERIALS
- FLAT PANEL ELECTROLUMINESCENT DISPLAYS
- MEGAWATT OPTICAL SWITCHES
- HIGH RATE HIGH ENERGY LITHIUM BATTERIES
- CAD SYSTEM DESIGN AND SIMULATION FOR CONCURRENT ENGINEERING

We have had a number of very significant accomplishments, many of which have transitioned into industry, and some are fairly remarkable. We routinely make chip-level devices in our laboratories whose feature size is about 10 times smaller than those of typical integrated circuits that are manufactured today as VHSIC circuits or VLSI devices, ushering in the next generation of microcircuit technology. Again, as a teaming effort with other scientists and engineers throughout the world who are working in that particular area.

We developed ultra-stable frequency sources, developed the entire process in-house. This essentially created the industry base for quartz oscillators that are a couple orders of magnitude more stable than what you find in your wrist watch or the like. We are now making smart oscillators that take their own temperature measurements and further correct themselves to provide communications-type applications. The NASA-proposed industrial enterprise to develop the PASS system for a personal cellular radio by satellite is made possible by that particular technology.

We have developed some of the world's highest energy product magnetic materials, and we did this for traveling wave tubes for the military. Now we are working with two hospitals to take Magnetic Resonance Imaging (MRI) equipment, which is one of the most expensive medical diagnostic equipment in most hospitals, and use our magnetic material to redesign the system so it can cost less for commercial use, and at the same time devise systems that the Surgeon General and his doctors can use on the battlefield to do direct imaging of soldiers' that have been injured, and to operate successfully in that environment.

I brought in a couple of displays, to show you because we have been the primary drivers within DOD for the development of flat panel electroluminescent displays. As a result, we have small brief-

case-size systems, such as you see, that have their own built-in flat panel. We are now getting ready to field that system, the first application being for the ordnance disposal people who go out and find a bomb on the battlefield. They may not know what type of bomb it is. There are 13,000 pages of reference information with artificial intelligence access built into the system. Operators can input what they see, find out exactly what they are looking at, and get all the information they need to defuse that ordnance in the battlefield.

There are other applications for this technology in bringing information to the commander or to the soldier.

Senator BINGAMAN. Who manufactures that?

Dr. THORNTON. We built that entire unit in-house as you see it there. The display panels themselves were built by Planar Industries. A few years ago, we got together with the Japanese—I happened to work with Japanese industry for 25 years before I came with the government. We took some of their technology and teamed with about four U.S. manufacturers on the various subcomponents for flat panel-electroluminescent displays. We put two companies in the business of building the drivers that were necessary to drive the displays. We exchanged masks; we added some of our own technology to it. We now have a militarized family of displays, as you see on the left.

I might say we were delighted this past year when DEC Computer Corporation, working with Planar, adopted this technology, and are now using this type of flat panel display for their next generation of work stations.

We are now pushing this low cost technology to achieve a full color display. We have had some remarkable achievements in color phosphors during the last year that will make this possible.

**ETDL**
**SIGNIFICANT PATENT**
**POSITIONS**

US ARMY
LABORATORY COMMAND

ELECTRONICS TECHNOLOGY and DEVICES LABORATORY

- MAGNETICS
- FERRITE DEVICES
- CRYSTAL OSCILLATORS
- OPTICAL SWITCHES
- NANOELECTRONICS
- BATTERIES
- DISPLAYS
- MM WAVE PHOTONICS
- SAW DEVICES
- IR DETECTOR

*ETDL GENERATES 35-55 PATENTS EACH YEAR*
*(55 IN 89 TOTAL DoE 215, ARMY 163, AIR FORCE 137, NAVY 124)*

Let us move on. As I mentioned earlier, we have a patent position. We generate from 35 to about 55 patents each year in our laboratory of about 300 people. We produced 55 last year, and a similar number this year. That represents 30 percent of all the patents generated within the Army. And for reference purposes, I put up here the total number of patents in the DOE laboratories, in the Army, the Navy and the Air Force laboratories.

My whole purpose in describing the laboratory in this step is to indicate it is entirely possible to have a first-class, a world-class, highly competitive government in-house laboratory. I would like to go on now and talk about some of the innovative things that we have done in the last half decade to achieve quality results.

## "OPEN LABORATORIES" PROGRAM

US ARMY
LABORATORY COMMAND

ELECTRONICS TECHNOLOGY and DEVICES LABORATORY

- CENTER FOR RESEARCH & DEVELOPMENT COOPERATIONS/COORDINATION
- ON-SITE GOVERNMENT LAB/UNIVERSITY/INDUSTRY TEAMS
- JOINT COOPERATIVE PROGRAMS WITH CONTRACTORS
- IMPORTER OF FOREIGN TECHNOLOGY
  - TECHNOLOGY EXCHANGE
  - ENGINEER/SCIENTIST EXCHANGE
- LABORATORY / INDUSTRY / GOVERNMENT CONSORTIA

**SUCCESS IN THESE AREAS DEPENDS ON OUR STATE-OF-THE-ART CAPABILITIES/FACILITIES**

One of the very significant things we have done is to open our laboratory to outside users, and we have done this aggressively. Years ago, if industry or somebody came to our laboratory and wanted to work in the laboratory, we were afraid of all kinds of legal entanglements. At least, we did not aggressively pursue it.

Today, we have between 150 and 200 students, professors, and other scientists and engineers, from both academia and industry, who choose to work in our laboratory, on our projects, or projects of joint interest.

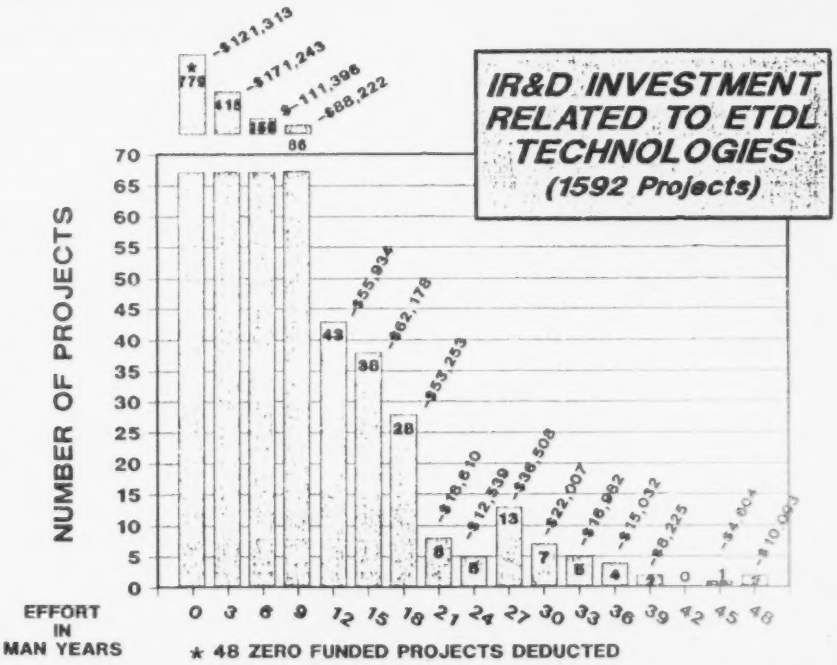
A few years ago, the National Academy of Science, i.e., the National Research Council accredited the Laboratory for official post-doctorate research. We then were approached by the National Science Foundation. They assessed our microfabrication facilities as a Center of Excellence. Under a joint agreement they go out to universities and give grants to the professors with the understanding that the student come to our laboratory to do his/her graduate research. We have now had students for 1, 2, and 3 years in the program in our laboratory. This avoids the necessity for duplicating the millions of dollars worth of facilities that would otherwise be

required at every location where the NSF would like to sponsor a particular program.

Just this past year, we have signed a similar agreement with the Science and Technology Commission in the State of New Jersey. The Commission places research grants, and then we leverage those dollars by tying in with the companies and the universities that they are funding, in teaming efforts so that our facilities and expertise are available to ensure projects of mutual interest are successful.

We have also aggressively gone after technology transfer from other countries. I mentioned my own background in working with Japanese countries for many years. I built plants in Japan, while in private industry, and trained Japanese engineers and scientists in the 1950s through the early 1970s and developed projects jointly with them. Some of my people served in Japan for 2 or 3 years. In fact, Mr. Miller, who heads up my display group, was in Japan for about 3 years.

We have a pretty constant interchange with our Japanese and European counterparts, and we have a large number of product areas where we interact on a person-to-person basis, because that tends to be the way that technology transfer works the very best. We have established joint efforts, and in several cases transitioned foreign technologies through our people into U.S. industry.



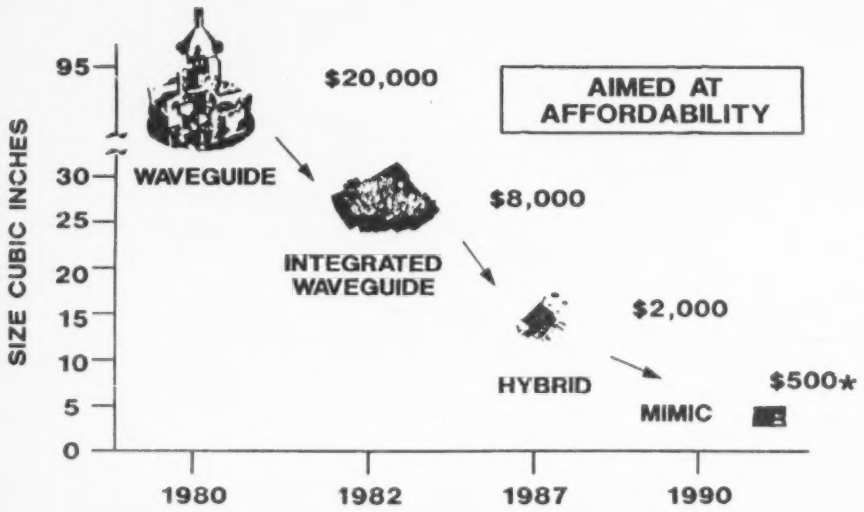

After working with the Defense Science Board in 1986, when I was a government advisor reviewing the U.S. semiconductor manufacturing competitiveness, I had an analysis made of the IR&D programs that pertained to the development of electronic components. We looked at about 1,500 projects. What I have shown here is a bar graph of the number of manyears per project. You can see the majority of those projects have less than 6 manyears and a very large

number of them have 1 or 2 manyears on projects in any given company.

There were a lot of sub-critical programs—and when I was in industry, many of our programs were of the same type—they enabled us to keep our finger in the pie, but very few programs were of a critical mass that might produce a new product or a really new breakthrough.

## MIMIC PROGRAM

*MICROWAVE/MILLIMETER WAVE MONOLITHIC INTEGRATED CIRCUITS (MIMIC)*




Consortia formation is one of the things we have done to attack this problem involving new operating philosophy for us. The best example is in the formation of the MIMIC program. When we decided to start the MIMIC program about 3 years ago, I had just come back from Japan and gone through, with my friends there, their gallium arsenide work with integrated circuits, and R&D facilities. I spent a day in each of about eight companies. Every one of those companies had 90 to 125 people, by my count, working on the specific technology we critically needed to upgrade our defense capability. This is the technology that will provide the sensors essential for a large number of our missiles, radars, EW systems and communications.

We went through our industry and did a similar analysis, and we could not find a U.S. company that had more than 20 or 25 people working in this specific area. This was a great concern, because there were six critical research sub-projects in which we had to produce major advances if we were, in fact, going to develop the capability that we needed, and we did not see that any company had the resources to do it.

## MICROWAVE MILLIMETER CONSORTIA

US ARMY LABORATORY COMMAND

ELECTRONICS TECHNOLOGY and DEVICES LABORATORY

- HUGHES / GE (AF)
  - E-SYSTEMS
  - MA-COM
  - HARRIS
  - AT&T
  - EESOF
  - CASCADE
  - MICROTECH
  - HERCULES
- MARTIN MARIETTA / ITT (A)
  - HARRIS
  - PACIFIC MONOLITHIC
  - ALPHA INDUSTRIES
  - WATKINS-JOHNSON
- RAYTHEON / TI (N)
  - AEROJET
  - AIRTRON
  - CONCILIUM
  - GENERAL DYNAMICS
  - MAGNAVOX
  - NORDEN
  - TELEDYNE
  - COMPACT SOFTWARE
- TRW (A)
  - GENERAL DYNAMICS
  - HITTITE
  - HONEYWELL

So, what we jointly did under DOD/Tri-service direction was to form four, large U.S. industry consortia. As you know, forming teams is not new to the Department of Defense, but generally in the past, those have been complementary teams. In contrast, these are supplementary teams. For example, one of those teams was General Electric, Hughes, AT&T and MA-COM, all of whom had their own R&D fabrication process. Team members agreed to share their data and patent rights and their knowledge base with each other, and combine their existing processes as a base-line. They then formed research teams comprised of the best researchers across all four companies to attack major R&D problems that had to be solved to have a successful program.

That program, which has been under way for a year or two has made enormous strides reducing the inherent cost of some of these circuits by as much as 80 percent.

I went into some detail with this example to indicate the general methodology which we are now using. If we have a task to accomplish, we put together an entity that can, in fact, be competitive, and that will be here in the future when we need that capability to support our military activity.

## ETDL SPONSORED COOPERATIVES

| SUBJECT | MEMBERS |
|---|---|
| TFEL DISPLAY | GTE, PLANAR, HYCOM, SUPERTEX, NORDEN |
| ULTRAPURE QUARTZ | OK STATE U, LAWRENCE LIVERMORE LABORATORY, SAWYER |
| PRECISION OSCILLATOR | GE NEUTRON DEVICES, BENDIX, PIEZO TECH., INC. |
| QUARTZ STUDIES | PRINCETON U, RENSSELAER, MCI, RAYTHEON |
| MET DATA SYSTEM | TRW, SAWTEK, TRACOR, BENDIX, VIZ |
| MLRS MM XVCR | TRW, HUGHES, (MARTIN, DIEHL, THOMPSON CSF, THORN) |
| SADARM MM XVCR | HONEYWELL, VARIAN, HUGHES. AEROJET, ALPHA |
| MM WAVE ANTENNAS | BALL AEROSPACE, TRW, FLAM & RUSSELL |
| SATCOM–SCOTT TRANSMITTER | STEINBRECHER, M–A/COM, HUGHES, FLAM & RUSSELL |
| NOISE SOURCE FOR 94 GHZ | NOISE COM, M–A/COM |
| TANK DEFENSE RADAR | TACOM, TRW, TI, BALL, MILLITECH, PREDICTION SYSTEMS, MICOM, CHANG IND. |

## ETDL SPONSORED COOPERATIVES

CONT.

| SUBJECT | MEMBERS |
|---|---|
| LI THIONYL CHLORIDE BATTERY | SAFT, WHITTAKER-YARDNEY |
| RECHARGEABLE LI BATTERIES | EIC, MOLI ENERGY |
| UNIVERSAL BATTERIES | HONEYWELL |
| EPITAXIAL METALLIZATION | U. of MICHIGAN, U. of MINN. |
| MOCVD GROWTH TECHNOLOGIES | AMERICAN CYANAMID, EMCORE, POLYTECH U. |
| HETEROJUNCTION TECHNOLOGY | SCIENTIFIC RESEARCH, ASSOCIATES, U. OF MASS., PENN STATE U., MATERIALS RESEARCH CORP. |
| SUPERCONDUCTIVITY | PERKIN–ELMER, LAMBERTVILLE CERAMIC RUTGERS U., |
| PERMANENT MAGNET CIRCUITS | NYU, QUEENS COL. (CUNY), U. DAYTON, KJS ASSOC. |
| MICROELECTRONICS DESIGN | JERSEY CITY ST. COLLEGE, TELEDYNE BROWN ENG., RTI, CSC, U. VA, GTE, MENTOR GRAPHICS |
| VHDL CHIP EMULATION | GDE, SIGNETICS, VTI, SYNOPSIS, QUICKTURN, ITD |

Virtually every project we do today is done on a cooperative basis. I am not going to go through these in any detail. This is a listing of projects, and the companies and university teams that we have put together. Some are fairly loose teams. Some are very tight teams where we bring the people together at each stage, monitor the individual contracts in concert, and decide together how we are

going to move to the next stage of development. This is just another part of the list of projects that operate in that fashion.

We have a long history of developing component technology, and transferring it to industry, particularly to small businesses. This is necessary because there are many things that we are involved in including high energy batteries, very stable quartz crystal oscillators, magnetic materials and devices, where there is a limited industry base. So, we have transitioned our technology into a large number of small companies.

## COMMERCIAL APPLICATIONS OF ETDL DEVELOPED TECHNOLOGY

US ARMY LABORATORY COMMAND

ELECTRONICS TECHNOLOGY and DEVICES LABORATORY

- UV -- OZONE CLEANING
- CHEMICAL POLISHING TECHNIQUES FOR QUARTZ CRYSTALS
- METHOD OF BONDING QUARTZ CRYSTALS TO MOUNTING SUPPORTS
- METHOD OF CONTROLLING FREQ vs TEMP. CHARACTERISTICS
- METHOD OF MAKING HIGH SHOCK CRYSTALS

  METHOD OF MAKING HIGH FREQUENCY RESONATORS
- GENERIC CHEMISTRY FOR RECHARGEABLE LI BATTERIES FOR HAND TOOLS, CELLULAR PHONES
- VERSION OF LI $MnO_2$ CELLS FOR THROWAWAY BATTERIES FOR TAPE RECORDERS, CALCULATORS
- THIN FILM ELECTROLUMINESCENT DISPLAYS FOR AIRCRAFT DISPLAYS, COMPUTER DISPLAYS, AIRPORT SCHEDULE DISPLAYS, INDUSTRIAL CONTROL DISPLAYS, MEDICAL DISPLAYS
- MICROWAVE (MAGNETRON) TUBES FOR FAA RADARS, PLEASURE BOAT RADARS, MW OVENS
- FLAT PANEL ELECTROLUMINESCENT DISPLAY FOR DEC WORKSTATIONS

## COMMERCIAL APPLICATIONS OF ETDL DEVELOPED TECHNOLOGY

CONTINUED

US ARMY LABORATORY COMMAND

ELECTRONICS TECHNOLOGY and DEVICES LABORATORY

- VHF–UHF PIEZOELECTRIC RESONATORS SUCH AS IN CELLULAR PHONES
- HIGH POWER CONDITIONING, IMPROVEMENTS & QUALITY, FOR THE POWER INDUSTRY
- ARC PLASMA SPRAYING OF ELEC. MATLS. (THICK FILM/BULK APPLIC.) FOR MICROWAVE TUBE APPLICATION
- HOT PRESS FERRITE MATERIALS & TECHNIQUES FOR RECORDING HEADS
- DUAL TOROID PHASE SHIFTER FOR FAA RADAR APPLIC.
- PDB MIXER DIODES – MARCONI COMMERCIAL PRODUCT LINE
- GRADED – GAP HOT INJECTOR (GUNN DIODES)

POTENTIAL

- MICROCOMPUTER COMPENSATED CRYSTAL OSCILLATOR FOR COMM APPLS
- ADVANCED CATHODE MATERIALS (COBALT OXIDE, VANADIUM PENTOXIDE) FOR BUTTON CELLS, CAMERAS, CALCULATORS
- PLANARIZATION OF TFEL DISPLAY ELECTRODE STRUCTURES
- HIGH ENERGY MAGNETIC MATERIALS FOR HOSPITAL COMPUTERIZED TOMOGRAPHY (MRI)

Let's go on to the next viewgraph. This is a complete list of transferred technology—often critical to the survival of small enterprises.

## FEDERAL TECHNOLOGY TRANSFER ACT OF 1986

US ARMY LABORATORY COMMAND

ELECTRONICS TECHNOLOGY and DEVICES LABORATORY

- THIS ACT AUTHORIZES THE DIRECTORS OF FEDERAL LABORATORIES OF ALL AGENCIES TO ENTER INTO "COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENTS" WITH UNIVERSITIES, STATE AND LOCAL ORGANIZATIONS OR INDUSTRY.
- THE GOVERNMENT LABORATORY PROVIDES PERSONNEL, SERVICES, FACILITIES, EQUIPMENT OR OTHER RESOURCES WITH OR WITHOUT REIMBURSEMENT (BUT NO FUNDS TO NON–FEDERAL PARTIES).
- THE NON–FEDERAL PARTIES PROVIDE FUNDS, PERSONNEL, SERVICES, FACILITIES, EQUIPMENT, OR OTHER RESOURCES TOWARD CONDUCT OF SPECIFIED R&D EFFORTS THAT ARE CONSISTENT WITH THE MISSION OF THE LABORATORY.

We were delighted with the Technology Transfer Act of 1986. That gave us a powerful mandate that we needed to continue this work. We moved very quickly to establish an operating framework and standard legal agreements to work with industrial companies

in the kind of interrelationship that we had been doing, but now, to do it in a formal way that would benefit both parties.

**TECHNOLOGY TRANSFER ACT OF 1986**

COOPERATIVE AGREEMENTS IN EFFECT

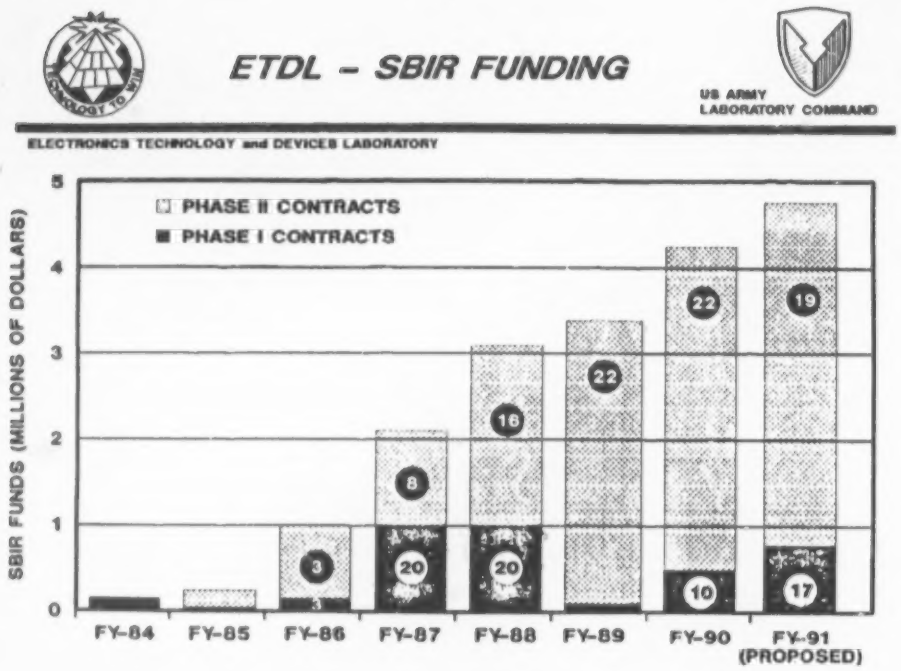
US ARMY LABORATORY COMMAND

ELECTRONICS TECHNOLOGY and DEVICES LABORATORY

| PARTICIPANTS | AREA OF TECHNOLOGY TRANSFER |
|---|---|
| ETDL - ELECTROMAGNETIC SCIENCES | HIGH POWER MILLIMETER WAVE EVALUATION OF FERRITE DEVICES |
| ETDL - TRONTECH | HIGH FREQUENCY OSCILLATORS AND AMPLIFIERS |
| ETDL - AM. CYANAMID - EMCORE POLY U. | OMVPE GROWTH TECHNOLOGIES |
| ETDL - RTI | E-BEAM CIRCUIT ANALYSIS |
| ETDL - EMC TECHNOLOGY | PROGRAMMABLE MICROWAVE ATTENUATORS |
| ETDL - MARTIN GOFFMAN ASSOCIATES | MILLIMETER WAVE SUPERCONDUCTOR DETECTORS |
| ETDL - MARTIN MARIETTA CORP. | MAGNETIC BIASING SYSTEM FOR MICROWAVE TUBES |

The Laboratory has implemented seven of these Cooperative Research and Development Agreements (CRDAs). We have another seven in process where we are already working together, but we are finishing up the legalities. Our lawyers get together with their lawyers and we work out the proposed approach, including the rights and data questions, and we now have a format for moving through this process successfully. Several of these CRDAs are now producing successful results.

Many of the engineers in our laboratories would have benefited quite significantly from royalties received from these agreements, if we had had this kind of a program over the past years because we have some 250 patents in key areas of component technology. It has really been a joy to put these programs together and to team with industry in this fashion. Much of this work has been done in our own laboratories with our facilities, as well as at the company with which we have teamed.




We are very active also in the SBIR program. We are a relatively small laboratory, however, we had some 70 SBIR programs. We typically go through the Phase I program, develop a model, and then we go into Phase II, and with 10 times that amount of money, work with the company on an informal basis, to try to get a successful product base for that small business. If the company is successful at that point, we are glad. If not, we may move forward another step and form a CRDA with them and continue that effort to make sure that we have, in fact, established a capability that will supply our military needs. We have enjoyed looking back at companies we have helped in that way in the past. This is a list containing several of those companies. We have spent 25–30 percent of our money every year in small business contracts, in transitioning our technology into small businesses and in developing the small business capability.

## SMALL BUSINESS INITIATIVE

US ARMY LABORATORY COMMAND

ELECTRONICS TECHNOLOGY and DEVICES LABORATORY

- A PROGRAM TO ESTABLISH NEW OPPORTUNITIES FOR SMALL BUSINESS GROWTH BASED ON ETDL TECHNOLOGY
- OVER AND ABOVE SMALL BUSINESS INNOVATIVE RESEARCH (SBIR) PROGRAM
- REPRESENTED 29% OF ETDL MISSION CONTRACT FUNDING IN FY89
- ORGANIZED SBIR WORKSHOP MAY 89 AT FORT MONMOUTH

### COMPANIES

ALTUS
ANALYTICS
EIC LABS
FREQUENCY ELECTRONICS
HITTITE MICROWAVE
HYCOM
MEASUREMENT CONCEPTS
PALISADES
PIEZO TECHNOLOGY
CAD LANGUAGE SYSTEMS, INC.
EPS, INC.
DE LORME MAPPING SYSTEMS
GEO-CENTERS, INC.
F & H APPLIED SCIENCE ASSOC., INC.
PLANAR
POWER CONVERSION
PREDICTION SYSTEMS
R&D ASSOCIATES
SAWTEK
SCIENTIFIC RESEARCH ASSOC.
SPIRE CORP.
STAR MICROWAVE
TENCO CORP
VITRONICS
GENERAL TECHNICAL SERVICES, INC.
CHANG INDUSTRY, INC.
SIERRA MONOLITHICS

## SOUND BUSINESS PRACTICES

US ARMY LABORATORY COMMAND

ELECTRONICS TECHNOLOGY and DEVICES LABORATORY

- UNDERSTAND OUR BUSINESS AND SERVE THE CUSTOMER
- TECHNOLOGY TRANSFER PLANNED IN ADVANCE
- GLOBAL APPROACH TO TECHNOLOGY PLANNING AND EXECUTION
- STRATEGIC PROGRAM EXECUTION – A TEAM EFFORT

To have the kind of personnel we have—and I think that most people who have visited our laboratory agree we have a very competitive R&D work force, we have done a number of things to boost that part of our operation. At the same time, we have implemented innovative changes in R&D procurement, many of which, I think, will flow out to other laboratories through the DOD demonstrationnstration project.

## INNOVATIVE OPERATIONAL PRACTICES

US ARMY LABORATORY COMMAND

ELECTRONICS TECHNOLOGY and DEVICES LABORATORY

- **DEDICATED R&D PROCUREMENT FUNCTION WITHIN THE LABORATORY**
- **CONTRACTOR SUPPORT FOR MAINTENANCE OF LABORATORY EQUIPMENT AND FACILITIES**
- **TOP QUALITY SCIENTISTS AND ENGINEERS RECRUITED INTO A QUALITY LABORATORY ENVIRONMENT**
- **CAREER DEVELOPMENT, JOB ENVIRONMENT, PROFESSIONAL TRAINING AND PERSONAL GROWTH**

We have a rather unique procurement operation that is collocated physically in the middle of the laboratory. We have delegated the management of this operation to an R&D acquisition manager, who works with a matrix of engineers and scientists, who conduct the contractual process—placing and jointly monitoring the contract. We have been able to move very quickly using the BAA role.

We were also able to get our commanders to allow us not to have to do all of the audits that you would do on every R&D program, and have shortened the acquisition time from what used to be 6 months to over a year, down to 2 or 3 months to get an R&D contract in place.

We have done a number of things in the personnel area. I do not want to go into a lot of detail, but our scientists and engineers are out in the universities. They are giving seminars constantly, and we have a lot of graduate students who come and work in the laboratory. Many of them stay on and become part of our permanent staff. Others go out to U.S. industry and write us letters about the training they have had that enabled them to get a good job in industry. We might like to retain them, but we are also fulfilling a need there, I think, in terms of training for industry.

Senator BINGAMAN. I need to ask you to try to conclude so we have time for the other presentations.

## NEEDS FOR STATUTORY RELIEF

ELECTRONICS TECHNOLOGY and DEVICES LABORATORY

- PROGRAM STABILITY – MULTI-YEAR R&D PROGRAM ELEMENT FUNDING
- DISCRETIONARY FUNDING TO LABORATORY DIRECTORS
- PURCHASING SYSTEM FOR LABORATORY EQUIPMENT AND SUPPLIES TAILORED TO R&D NEEDS
- DIRECT HIRE AUTHORITY AT ALL LEVELS
- EXPAND AND IMPLEMENT DUAL LADDER TO HIRE AND KEEP HIGH LEVEL SCIENTIFIC AND TECHNICAL EXPERTS

Dr. THORNTON. There are some areas in which we need statutory relief. I think all of these have been mentioned earlier in the presentation on the DOD Laboratory Demonstration project. To get a GS–15 industrial person, we have to offer him/her a job and hire the applicant on the spot. You cannot tell him/her to sit around for 6 months and wait until we get a review at higher levels by people who do not understand your qualifications for this specific job as well as we do. We need direct hire authority.

We need to get program stability. Thirty percent of our engineers' and scientists' time is occupied in selling and reselling, and reaffirming the need for their programs. If you consider it takes maybe 3 years to develop a product, you can see why we need multi-year funding. The issue of discretionary funds was also mentioned in earlier presentations. As Laboratory Directors, we need to be able to move fast, as the technology changes.

## CONCLUSIONS

ELECTRONICS TECHNOLOGY and DEVICES LABORATORY

**GOVERNMENT LABORATORIES SHOULD SERVE AS THE STEWARDS OF THE NATION'S (WORLD'S) SCIENTIFIC & TECHNICAL RESOURCES TO MEET THE COUNTRY'S NEEDS**

- THEY CAN RECEIVE LARGE AMOUNTS OF PROPRIETARY INFORMATION AND KNOWLEDGE THROUGHOUT THE FREE WORLD
- THEY UNDERSTAND THE IMPACT OF EMERGING TECHNOLOGY ON MILITARY DOCTRINE AND TACTICS
- THEY CAN TAKE THE "LONG VIEW" IN STRATEGIC PLANNING AND EXECUTION
- WITH SUPPORT AND ENCOURAGEMENT THEY CAN ACHIEVE WORLD CLASS STATUS

In this final viewgraph then, are the points that I would like to make. In-house government laboratories can, in fact, be very effective. They do have some significant advantages over an industrially operated laboratory. One of these is the fact that we receive vast amounts of proprietary information and proprietary products, without conflict of interest. We typically have information 2 or 3 years before it becomes public knowledge, and we can work directly with industrial organizations to develop effective investment strategies. We can implement overall DOD investment in those strategies without conflict of interest, because we are a government organization.

At the very same time, as I mentioned very early on, we are intimately involved in the development and testing of the concepts on the battlefield. So, we have the ability to transition that technology directly into the applications themselves. Our stockholders own us for longer than the 9-30 months that is typical with U.S. industry, so we can take a long view, and develop strategies which are aimed at things that are not going to reach their final fruition for 5 or 10 years, or more.

Given the support and the encouragement that we are getting with the demonstration project, and the opportunity to move out and do the things that we can do, government laboratories can, in fact, play a unique role and a very capable role.

[The prepared statement of Dr. Thornton follows:]

STATEMENT BY

DR. CLARENCE G. THORNTON

DIRECTOR, ELECTRONICS TECHNOLOGY AND DEVICES LABORATORY
U.S. ARMY LABORATORY COMMAND

Good afternoon, I am the Director of the U.S. Army Electronics Technology and Devices Laboratory (ETDL) at Fort Monmouth, N.J. This Laboratory is one of seven laboratories that comprise the U.S. Army Laboratory Command headquartered at Adelphi, Maryland, and which is part of the U.S. Army Materiel Command. This leading Army Laboratory has the mission responsibility to develop and transfer advanced and new electronic technology components and devices into Army systems to achieve affordable technological superiority and to insure that U.S. soldiers have the capability to fight and win on the battlefield.

Our mission is actually two fold--first to develop and transition critical technologies for Army systems; and second to provide technical support to Army and industrial program managers and development centers that produce end item systems. Although the emphasis shifts to meet priority needs, current fields of technical endeavor are integrated microelectronics and nanoelectronics including microwave, millimeter-wave, and photonic devices, magnetic and superconducting devices, flat panel displays, frequency control and acoustic wave devices, high energy batteries, and pulse power sources and conditioners. These are enabling technologies for future brilliant missiles, ultra-sensitive multi-targeting radars and electronic intercept and targeting systems, automatic target recognition systems, high power microwave beam weapons, high power jammers, electric guns, and intelligent information processing, communication and display terminals from vest pocket to Command Center size. Our job is to take out the "show stoppers" long before they become an impediment to successful engineering development, production, and fielding of these systems.

The ETDL program is part of an overall integrated Tri-Service Program working with our counterpart facilities in the Air Force and the Navy and coordinated and overseen by the DOD sponsored industry/government Advisory Group on Electron Devices. Device programs of interest to more than one Service are co-sponsored and co-monitored with technology transferred to the individual Services' system development programs.

I am also the Army Director for the newly completed DOD Very High Speed Integrated Circuits (VHSIC) Program and the DARPA Microwave Millimeter-Wave Monolithic Integrated Circuits (MIMIC) Program. We were very instrumental in the establishment of this latter program and in developing the consortia concept on which the program is based. We also are playing a leading role in the development and application of powerful computed-aided design tools that will permit optimization and total simulation of electronic systems and concurrent engineering of cost, manufacturability and maintainability prior to building hardware.

The Laboratory has been consistently ranked a Center of Excellence by its peers and its customers. It has been cited three times in the last six years as the Army Laboratory Organization of the Year. The Laboratory employs 300 people (of which 170 are scientists and engineers). However, this number is augmented by an additional 150-200 outside scientists and engineers that work in the Laboratory on Army programs on a full- or part-time basis and are funded by other agencies, universities, and industry.

This Laboratory typically produces more patents per capita than any other DOD or DoE laboratory facility (54 last year and a similar number this year, representing one-third of all Army patents). Our programs are driven both by an understanding of the battlefield and technology opportunities. Each year there are 40-60 significant technical accomplishments, and over 150 technology transfers to industry and universities that include 20-30 newly developed electronic components provided to developmental test systems and test beds in government laboratories and private industry.

For the past decade, we have provided enabling technology to over 100 systems/equipments that are now fielded or in engineering development. ETDL championed the first automatic assembly of printed circuit boards and later developments in microelectronic devices; the first ultra-stable crystal oscillators for secure radios, stable airborne radars and IFF systems; the highest energy product temperature-stable magnetic material for small, high power microwave tubes for UAV-borne radar and jamming; the first US-manufactured thin-film flat panel electroluminescent soldiers' displays; the first high-power lithium throwaway and rechargeable batteries; the first quantum-dimensioned microwave frequency sources and the first broad application of surface acoustic wave delay lines, pulse compressors and filters for radar systems. ETDL holds more than 250 patents in these areas of development.

During the past decade this Laboratory has undergone a major positive cultural change, progressing from an organization that pursued its own mission program with assigned resources to assuming a leadership responsibility within the national and international technical community--teaming ETDL with industry, academia, and other government laboratories and agencies to meet requirements that would demand far more than ETDL's own resources could accomplish alone.

After receiving accreditation for post-doctoral research from the Academy of Sciences' National Research Council, ETDL signed landmark agreements with the National Science Foundation and the N.J. Commission on Science and Technology, whereby these organizations provide grant monies in areas of mutual interest to universities and small businesses. Industry and university professors and students then come to ETDL to conduct their research under our mentorship and use ETDL facilities that otherwise would have to be duplicated at considerable additional cost at each industry and university location.

We typically expend 24 percent of our own resources in small business awards and have nurtured the development of Army-responsive small businesses through multiple transfers of technology products to support their business interests. Our share of the Small Business Innovation Research program (SBIR) has grown to over $4M, and we have already supported over 70 SBIR contractual efforts. ETDL has successfully transferred important technology to 18 emerging small businesses in recent years to ensure their continued operation.

The Laboratory has also executed an aggressive program under the Technology Transfer Act of 1986, being among the first to develop an effective, approved framework for the execution of such programs, and was cited by the Secretary of Commerce and the House Subcommittee on Science, Research and Technology for our effort in this regard. ETDL currently has seven Cooperative Research and Development Agreements (CRDAs) in effect and seven more pending.

I mention these accomplishments to indicate that it is entirely possible to operate a high-impact program and technology-competitive Laboratory within the Government Laboratory system.

To this end emphasis has been given to the development of sound business practices:

a. Understanding of the Army needs on the battlefield and an abiding concern for our customers' specific needs in the system development community. Our engineers and scientists regularly study battlefield doctrine and Army fighting systems. In a given year over 200 joint planning interactions with customers have established and reaffirmed R&D approaches to overcoming over 100 battlefield deficiencies. We strongly supported the development of the Army Technology Base Master Plan.

b. A specific technology transfer mechanism is nearly always in place at the start of a development program by which an anticipated component or technological capability will transition into an expected system or testbed. The transfer is usually directly into an industrial organization and is

tailored to the needs of a specific system demonstration. There are currently 65 technology transfer plans for items under development.

c. Our global approach to technology planning and development has included a dozen or more informal transfers of key technologies from Japan or Europe via our scientists and engineers working directly in concert with their overseas counterparts.

d. We execute nearly every project as a national or international team effort, capturing the best engineering talent from other organizations into consortia that have the critical mass of resources needed to compete globally in supplying defense needs while, at the same time, supporting and teaming directly with an infrastructure of smaller, highly innovative research organizations working in emerging technologies.

As a single example I would cite our success on the Microwave Millimeter-Wave Monolithic Integrated Circuits referred to as the MIMIC Program. After a detailed review of Japanese companies in 1986 prior to the establishment of the MIMIC program it became obvious that no single US company could compete and remain as a DOD supplier of this militarily critical technology. Six or more Japanese companies each had over 100 engineers or scientists working in the field. No US company had more than 25. We then formed four large teams each composed of several major US companies that agreed to share all of their rights and data in order to have the resources to develop the required MIMIC components for our Missile, Radar, Electronic Warfare and communications systems while remaining competitive as suppliers of DOD systems.

Our operational goals have been met by working within the system through a number of innovative approaches that are supported by the Commander of LABCOM and the base Commander at Fort Monmouth where we are a tenant. The forthcoming DOD Laboratory Demonstration Program will support the extension of some of these practices throughout LABCOM and other Government Laboratory Organizations as well as providing proposals for statutory changes that could further improve the Federal Laboratories system.

Specific innovative operational practices that we have demonstrated include:

a. We have placed a dedicated R&D procurement function directly within the Laboratory; that is, a manager of R&D acquisition that chairs a team of procurement and R&D professionals tailored to the acquisition needs of a specific program. The direct interfacing between the procurement authority and the engineers and scientists, joint execution of the program, and the application of innovative procurement procedures have shortened contract placement time from over a year in some cases to as short as two months. Innovative procurement practices have included extensive use of the Broad Agency Announcements (BAAs), reduced oversight reviews, appropriate levels of audit reviews, and extensive use of automation. Statutory changes indicated below could further expedite the R&D acquisition process.

b. We provide contractor support for maintenance of laboratory equipment and facilities, thus freeing up engineers and scientists for high quality research. Quick-turn-around repair and maintenance service on call that is geared to supporting the Laboratories' high tech equipment and facilities have greatly improved the research environment, morale, and productivity. Again, statutory changes to further simplify the R&D purchasing system are also desired.

c. Top quality engineers and scientists have joined the Laboratory in spite of lower-than-competitive salaries, to find a quality work environment and the opportunity to have an impact on their country's needs. Nonetheless, failure to pay scientists, engineers, and R&D managers a competitive wage remains a major stumbling block. Successful recruitment has been accomplished, however, throughout the university system by intensive Laboratory-University interaction with our scientists and engineers giving seminars and serving as adjunct faculty and advisors. Emphasis is also given

to Historically Black Colleges and Universities/Minority Institutions and schools for the handicapped. The number of students doing their graduate research theses in the Laboratory has also provided potential candidates. One hundred percent continual re-training of the existing work force to keep pace with new, rapidly emerging technologies has been an integral part of our Total Quality Management Program.

d. Each year ETDL has continued to generate new initiatives to ensure that every employee is achieving his/her full potential through career development, job enrichment, professional training, and personal growth. We have developed a competent enthusiastic work force of whom over 90% are in continuing education programs. In 1988, the Laboratory published a handbook of "Innovative Personnel Practices" to improve the Army-wide climate for recruitment and retention by sharing their most successful ideas and concepts. ETDL has championed the establishment of dual ladder "Fellow" positions for outstanding scientists and engineers from journeymen to SES equivalent supergrades to recruit and retain key individuals in government service. We have provided personal-growth/human-potential training programs to over two hundred employees and their families.

The Laboratory Demonstration Program will probably seek help from the Administration and the Congress to grant statutory relief in a number of areas that can provide further improvement:

(1) Provide program stability at the Laboratory level through long-term funding of R&D in targeted critical emerging technologies. Twenty percent of our researcher's time, and 50 percent of our R&D manager's time and attention are lost in reaffirming and in reselling their programs, through a multitude of overseers. In today's fast-changing environment, Laboratory Directors also need at least 20 percent of their funds as completely discretionary to advance new technologies rapidly to product status, without having to justify these efforts in advance.

(2) Provide the Laboratory Director with a purchasing system for laboratory equipment and parts that is appropriate to R&D Laboratories, i.e., to buy directly and judiciously from vendors based on the scientists' and engineers', and Laboratory managers' expertise rather than through the present system that was designed for buying military hardware. To perform its R&D mission effectively and provide national leadership to the US R&D community that supports our defense needs, the Army must maintain state-of-the-art facilities and a world-class research and development environment. Also, raise the 10-year-old limits on minor construction authority at the Laboratory Director level to take into account today's five-to-tenfold increase in the cost of high- technology Laboratory facilities.

(3) Provide direct hire authority to the R&D managers who alone have the expertise to evaluate and acquire highly qualified scientists and engineers for specific areas of endeavor. The opportunity to hire a key scientist or engineer at present is often lost during the many months review at higher levels that is now required at various OPM locations.

(4) Expand the dual ladder system to provide a true opportunity for outstanding scientists and engineers to achieve equal status and salary to that of Senior Executive Service personnel. A leading "chair" at a major university today provides a salary of $125-$150,000 per year to such individuals. The law authorizes 517 Science & Technology (S&Ts) positions, however, only 150 positions have been filled--controlled by OPM. Delegate a full quota of S&Ts to OSD to be allocated to the Services and filled locally rather than on a case-by-case basis at OPM.

In summary, I would like to say that Government Laboratories have a unique role to play in meeting our future defense needs. They alone are in a position to receive, and use it impartially, large amounts of proprietary information and knowledge of other organization's capabilities throughout the industrial and academic world, executing the DOD R&D program without conflicts of interest.

At the same time, they are also in a unique position to understand (and in fact contribute to) military doctrine and tactics and expected future trends in fighting systems. Thus they are essential to effective technology transfer.

Finally, in the support of the whole of DOD, they can take the long view. Working with industry and academia, they can create strategic plans and pursue a mix of long- and short- term R&D goals without pressure just to meet this year's profit objective.

Appropriately supported and encouraged, they can attract superior scientific, engineering, and management talent and provide the leadership necessary to nourish a high level of invention and innovation and to transfer the country's R&D achievements into the best of affordable military systems.

Senator BINGAMAN. Thank you very much. It is a very impressive list of accomplishments.

Dr. Coffey, why don't you go right ahead.

## STATEMENT OF TIMOTHY P. COFFEY, DIRECTOR OF RESEARCH, NAVAL RESEARCH LABORATORY

Dr. COFFEY. Mr. Chairman, I am pleased to be here this afternoon. I am especially pleased that you are taking the time to look into this particular aspect of the DOD infrastructure. In the interest of time, I am going to skim through this statement, so I will not give a complete reading of it.

NRL is generally referred to as the Navy's Corporate Research Laboratory which deals with the broad-based research and exploratory development program that we carry on. We also, where appropriate or where necessary, carry concepts through prototype development. The corporate nature of NRL does not limit us to any particular product line, which is a particular characteristic of this institution.

Another aspect of NRL that you need to understand is that we operate under what is called the Navy Industrial Fund, which is no fund at all. This means we are not an appropriated activity, but rather generate our program by sales to sponsors. That increases responsiveness to the sponsors. On the other hand, the broadly based character of the laboratory prevents us from becoming captive of any particular sponsor. It allows us to maintain a degree of scientific integrity.

In the field of research and development, the only proven method of judging organizations, in my opinion, is their track record. I think you will find that this laboratory has an outstanding track record. The laboratory did seminal work in the United States in the early phases of radar. In fact, NRL holds the first radar patent in the United States. The lab was a key player in the movement of the Nation into space science and space systems, first, through the exploitation of the captured V-2 rockets, then through the management of the scientific satellite project prior to the creation of NASA.

When NASA was created, NRL transferred several hundred scientists and engineers to initially staff up the organization. The laboratory has produced two Nobel laureates, one of whom still runs a research program at NRL after 45 years of Federal service. His contribution, incidentally, was one of the keys to breaking the code

in DNA and RNA. I should also point out, we have at least one other scientist who is seriously considered for a future Nobel prize.

NRL publishes about 1,000 papers each year in the open literature and holds in excess of 3,000 patents. In the area of technology transfer, I think you will find a significant record. I previously mentioned radar. The laboratory also produced the first fissionable U235. This separation technology was transitioned to Oakridge at the beginning of the Manhattan Project. NRL has made major contributions to: the development of fire-fighting agents; development of space tracking systems; development of radar absorbing materials; the clocks in the global positioning system; the field of fluroropolymers, high-powered glass lasers, and many others. I'll have more to say on technology transfer in a few minutes.

Another aspect of NRL is we have been and continue to be a major player in development of technology in support of surveillance systems. These are systems which are space based, undersea based and atmosphere based. In this context, we have specific interest in imaging radar and infrared systems, fiber optic sensors, exploitation of parallel computers, development and exploitation of non-linear signal processing techniques and the development of ultra-sensitive detectors.

We also conduct a very broad program in materials research and component technology in support of the overall surveillance thrust.

The breadth of NRL is probably what distinguishes the laboratory from most other research institutions. Many of the great contributions the lab has made, were a result of the multidisciplinary nature of the institution. The lab's ability to form up highly competent teams from the existing staff, I think, has served the Navy and the Nation well.

We are presently working this multidisciplinary aspect of NRL to work such important and diverse problems as anti-submarine warfare; the use of high-temperature superconductivity for practical Navy systems and the exploitation of the remarkable developments in the area of biotechnology. You will find few organizations which are capable of addressing such a broad range of topics for military applications.

Now, I would like to turn back to the subject of technology transfer. It is reasonable to ask the question: How will a lab like NRL deal with future tech transfer issues? I would speak of technology transfer in the general sense of transfer to the defense industry and transfer of dual-use technology. I think, up front, I need to state that I would expect NRL will maintain the focus appropriate for a defense research laboratory.

Nevertheless, technology transfer is an essential ingredient of our objectives. I have noted that NRL is not a product laboratory. Therefore, we must transfer what we develop, if we are to have any serious impact.

The track record, I think, also says that we have had serious technology transfer efforts for many years. Most of them have been to the defense industry, but in recent years, you have seen an increase of emphasis in the transfer to the commercial sector.

In this regard, I would note the recent developments that NRL has been making in the area of bimolecular engineering. This is a rather new initiative on the part of the laboratory that has led to a

major cooperative research and development agreement with the Shipley Corporation. This agreement was executed under the authority of the Federal Technblogy Transfer Act of 1986.

Shipley, in fact, is a chemical specialty company that produces about half the photo resists for the semiconductor industry. The Shipley-NRL collaborative effort is leading to a potentially revolutionary optical microlithography process for the production of microelectronic components such as computer memory chips, transistors, capacitors.

We have produced in the laboratory, in conjunction with Shipley, working devices which are less than one-half micron resolution. The process, in addition, is potentially cheaper and less toxic than those conventionally employed in this country and in Japan. This technology will have significant commercial applications while providing the tech base for future military electronic systems.

We are now employing the same microlithography process to pattern neural cells on electronic substrates. Our basic effort is to use the tools of the biotechnology, physics, chemistry, engineering, to create a new suite of environmental and surveillance sensors and new bio-based materials.

All of this is being developed as a result of new opportunities for technology transfer and as a result of the day-to-day association of physicists, chemists, biologists and engineers. NRL has been held up as a model of a self-contained, interdisciplinary laboratory.

In these few minutes, I have tried to summarize some of the past accomplishments of NRL, and some of the current progress of NRL. I hope my remarks will help you understand why you have an NRL. But in a nutshell, the purpose of NRL is to insure that the U.S. Navy is never defeated or takes unnecessary casualties because it faces a technologically superior foe.

Other things NRL is expected to do, in addition to advancing the state of the art, is to play a role in the training of scientists and engineers. We take this quite seriously. At any instant of time, there are approximately 100 postdoctoral appointees working at the laboratory. During the summer months, we provide employment and work experience for in excess of 100 selected high school students under the Science and Engineering Apprenticeship Program.

We are also expected, of course, to propose new solutions and new systems in response to identified threats. This often requires a quick reaction capability in response to urgent requirements. I think the laboratory's contributions in the recent Persian Gulf crisis provide ample testimony, both for the need for this kind of capability, and for the level at which the laboratory can respond.

If you are familiar with what the laboratory contributed in terms of the level of sophistication, the scope of what we undertook and the speed with which we undertook it, I think you will agree that the response was quite remarkable, and provides better testimony than I can provide here on why you have an NRL.

The real issue to be faced is not do you need an NRL, but how do you keep NRL the vital, innovative establishment which it has historically been? I am pleased to say that today the laboratory is as innovative as it has ever been in any point of its history. We have hired, for example, several hundred Ph.D.s in specially targeted

areas, and we have succeeded in lowering the average age of the laboratory during the past decade.

There are, however, storm clouds on the horizon. The problem of adequate pay for the best scientists and engineers is well known. During the next decade, you will see retirement, natural retirement, I might say, of a large number of senior scientists and engineers at the laboratory. While this poses a serious problem for the laboratory, it also presents a remarkable opportunity to renew the NRL workforce.

In the final analysis, the problem of retaining NRL as a great research laboratory boils down to a question of compensation. I think it is important that we understand that compensation is not as simple as dollars. Although it is true that salaries and benefits are an important ingredient in compensation, at a research laboratory you must pay special attention to the psychic income. Psychic income relates to the quality and importance of the laboratory's program, the capability of the laboratory's facilities, the quality of colleagues, the ability to take risks and occasionally being allowed to fail, recognizing people for their accomplishments, and in general, maintaining a healthy environment. True compensation involves some tradeoffs amongst all these factors. Our final success will be judged by how well we did these tradeoffs.

While much must be done by NRL, we at NRL cannot handle this alone. We must work with the executive department and with legislators to achieve a proper balance, in particular, some narrowing of the pay is required for the best scientists and engineers. A more rational method must be found to renew the laboratory's facilities, and, I believe, some control must be achieved of what I call the obsession with audit or the "audit mentality," the preoccupation with process before substance or control before content.

I would like to conclude by stating that while there are problems, to be sure, we must keep things in perspective. We are living in an absolutely marvelous time, from the point of view of science and technology—perhaps the most significant time in our history. We in this room will see things that 10 years ago we could not have imagined. I fully expect that the Naval Research Laboratory will play a key role in achieving many of these future accomplishments.

I thank you for the opportunity to address the subcommittee. I will be pleased to respond to questions.

[The prepared statement of Dr. Coffey follows:]

STATEMENT OF

DR. TIMOTHY P. COFFEY

DIRECTOR OF RESEARCH

NAVAL RESEARCH LABORATORY

Mr. Chairman and distinguished members of the subcommittee, I am pleased to participate in these hearings on Department of Defense in-house laboratory management. I am also pleased that the subcommittee has taken the time to address this aspect of the DoD R&D infrastructure.

I am the Director of Research of the Naval Research Laboratory. This Laboratory reports to the Office of Naval Research. It is often referred to as the Navy's Corporate Research Laboratory because it is the principal in-house activity for conducting research across the whole spectrum of the physical, space and engineering sciences. The laboratory also conducts a broadly based program in exploratory development in order to transition our research product to other government labs and industry, and where necessary, takes concepts through the prototype development phase. As such, the Laboratory is not limited to a specific product line. Another aspect of NRL which shapes our way of life is that the Laboratory operates under the Navy Industrial Fund. In simple terms, this means that there is no appropriation for the NRL, but rather the Laboratory funds its program by proposing work for funding by Navy and other government sponsors. Since the sponsors decide whether or not to fund the proposals based upon the proposals' overall importance to them, this encourages NRL responsiveness to Navy and government needs. On the other hand, the breadth of the NRL programs keeps NRL from becoming the captive of any one sponsor and allows it to preserve a spirit of scientific independence and integrity.

In the field of research and development, the only proven method of judging an organization is to review its track record. You will find that the NRL has a long history of significant achievement. The Laboratory performed the seminal work in the United States on the development of radar and holds the first U.S. patent on radar. The Laboratory was a key player in leading the nation into space research and space systems, through exploitation of captured V-2 rockets after World War II and through management of the scientific satellite project, prior to the creation of NASA. In fact NRL provided a significant cadre of scientists and engineers for the formation of NASA. The Laboratory has produced two Nobel laureates, one of whom still leads a research team at NRL after 45 years of government service. He was recognized for making one of the key discoveries which allowed the determination of the structure of molecules such as DNA and RNA. Nobel laureates are not just in our past, however. We currently employ at least one other serious contender for the Nobel Prize. The Laboratory produces over 1000 open literature scientific and technical papers per year and has been granted more than 3000 patents. You will find that the Laboratory has a significant record of technology transfer. These transfers include radar, $U^{235}$ separation technology, fire-fighting agents, spacecraft tracking systems, radar absorbing materials, clocks for the global positioning system, important fluoropolymers, high-power glass lasers, and many others. I will address some recent technology transfer issues later in these comments.

In order to remain at the cutting edge of science, NRL's research activity includes an aggressive program for development of sophisticated measurement techniques which require increasing sensitivity under demanding conditions. The application of these scientific techniques has led us into the surveillance mission. NRL has

been and continues to be a major player in the development of technology for surveillance systems. This includes systems which are space-based, atmospheric based, and based undersea. Areas of special interest to the Laboratory include imaging radar and infrared systems; fiber optics and fiber optic sensors; optical and RF interferometry; exploitation of advances in massively parallel computing; nonlinear methods for signal processing, and ultrasensitive RF detection. In addition to these surveillance specific technologies, the Laboratory's broad program in materials research and device development, supports the overall surveillance thrust of the Laboratory.

The breadth of the overall undertaking at NRL is probably what distinguishes NRL from most other research organizations. Many of the great contributions of the Laboratory have resulted from colocation of so many different disciplines. NRL's ability to form up, on short notice, highly competent multidisciplinary teams from existing staff has served the Laboratory and the Navy well over the years. We are presently working this multidisciplinary aspect of NRL to address such diverse problems as anti-submarine warfare, the application of high temperature superconductivity to practical Navy systems, and the exploitation of the remarkable advances in biotechnology. There are few organizations which can address such a broad range of topics for military applications.

The subject of technology transfer has been receiving increasing attention in recent years. It is reasonable to ask how NRL, as one of the government's major research laboratories, will participate in the area of technology transfer. I speak of technology transfer in the general sense of transfer to the defense industry or transfer of dual use technology. I would note up front that NRL will maintain a focus

which is appropriate for a defense research laboratory. Technology transfer, however, is an essential ingredient within NRL's objectives. As I noted earlier, NRL is not a product laboratory. Therefore, we must transfer what we develop if we are to have an impact. We have always been serious about technology transfer, as I believe the track record which I outlined earlier indicates. While most of our transfer efforts have focussed on transfer to the defense industry, we are increasingly involved in transfer to the commercial sector. In this context, I would note some recent developments which have emerged from our relatively new initiatives in the area of biomolecular engineering. These developments have led to a cooperative research and development agreement between the Shipley Corporation and NRL, executed under the authority of the Federal Technology Transfer Act of 1986.. The Shipley-NRL collaborative effort is leading to a potentially revolutionary optical microlithography process for making microelectronic devices such as computer memory chips, transistors and capacitors. Working electronic devices with circuit dimensions less than one-half a micron have been built, but just as important is that the process is potentially much cheaper and less toxic (cleaner environmentally and safer for labor) than conventional technology used in this country and Japan. This new technology has the potential of significantly impacting the commercial sector, while providing the technology base for the development of the next generation of more sophisticated electronics necessary for our military defense.

To pursue this example further in order to show how this military laboratory is able to capture and capitalize upon its unique interdisciplinary composition, we are now employing this same microlithography process to pattern neural cells on electronic substrate surfaces. To further exploit this melding together of diverse

sciences and engineering, we are also utilizing the tools of biotechnology with those of the physicists, chemists and engineers to develop new environmental and surveillance sensors and new biologically-based materials of military and civilian utility. These latter include elastomeric, antifouling and anticorrosive, and energy absorbing materials. All have extensive civilian and military applications.

These economically and strategically important products are being developed, and as a result of new opportunities for technology transfer within, and out of, a highly interdisciplinary laboratory where there is a natural, day-to-day association of engineers, physicists, chemists and biologists. NRL is pointed out as a model of a self-contained, interdisciplinary, R&D laboratory.

In these few minutes, I have tried to summarize some of the past accomplishments of NRL and some of the current progress at NRL. I hope my remarks will help you understand why you have an NRL. In a nutshell, the purpose of NRL is to insure that the U.S. Navy is never defeated or takes unnecessary casualties because it faces a technologically superior foe. More specifically, the Laboratory provides government technical expertise to the Navy, the Department of Defense and other agency decision makers.. For instance, with respect to support of other agencies, I would note that I personally have served on, and currently serve on, a number of committees which advise the Department of Energy regarding programs at the national laboratories. NRL is expected to advance the state of the art of science and technology for the DoD and for the nation. From my previous remarks I believe one could conclude the Laboratory has made important contributions here. It is also a function of NRL to

train scientists and engineers. This is a non-trivial function. At any instant of time, there are approximately 100 postdoctoral appointments at NRL. During the summer, the Laboratory also provides employment and work experience for over 100 selected high school students under the Science and Engineering Apprenticeship Program. The Laboratory has many other activities which contribute to the nation's overall education program. Another function of the Laboratory is to propose new solutions and new systems in response to identified or perceived threats. This often requires the Laboratory to provide quick reaction capability in response to urgent requirements. A recent example of this was the Laboratory's contribution in responding to the crisis in the Persian Gulf. Those of you who are familiar with the Laboratory's contributions in this area understand the level of sophistication of the technology which NRL brought to bear, as well as the speed and scope of the NRL contributions. The Laboratory's response was quite remarkable and I believe provides much better testimony than I can provide here on why you have NRL.

The real issue which we face is not do we need an NRL, but rather how to keep NRL the vital innovative establishment which it is and historically has been. I am pleased to say that, today, NRL is as productive as at any time in its history. In spite of many problems, we have succeeded in adding several hundred PhD's in targeted areas of research to the Laboratory's staff and in reducing the Laboratory's average age over the past decade. There are, however, storm clouds on the horizon. The problem of adequate pay for the Laboratory's best people is well known, but I daresay not well understood. During the next decade, the Laboratory will see a natural, but massive turnover amongst its senior management and senior scientific and engineering workforce. While this poses a serious problem, it also

provides a marvelous opportunity to renew the NRL workforce. In the final analysis, the problem of retaining NRL as a great research laboratory boils down to a question of compensation. It is important to note, however, that compensation is not as simple as money. It is true that real income such as salary and benefits is an important component of compensation. At a research laboratory, however, one must pay very serious attention to psychic income. This includes the quality and importance of the Laboratory's program; the capability of the Laboratory's facilities; the quality of colleagues; the ability to take risks, and being allowed occasionally to fail; the recognition of people for their accomplishments; and in general, the maintenance of a healthy environment. True compensation involves some tradeoffs amongst all of these factors. Our final success will be determined by whether we have made these tradeoffs satisfactorily. While much of this must be done by the Laboratory, we at NRL cannot handle this alone. We must work together with the executive department and with legislators to arrive at the proper balance. In particular, some narrowing of the pay gap for the best people is required. A more rational way to renew the Laboratory's physical plant is required; and finally, some control of the obsession, which I would refer to as the "audit mentality," must be achieved.

I would like to conclude by stating that while there are problems to be sure, we must keep things in perspective. From a science and technology perspective, we are living in an absolutely marvelous time, perhaps the most significant time in our history. We in this room will see accomplishments which we could not have imagined just ten years ago. I fully expect that the Naval Research Laboratory will play a key role in achieving many of these future accomplishments.

I thank you for the opportunity to address the subcommittee, and would be pleased to respond to any questions at this point.

Senator BINGAMAN. Thank you very much. That is excellent testimony. Dr. Richey, why don't you go ahead before I ask questions.

**STATEMENT OF KEITH RICHEY, WRIGHT RESEARCH AND DEVELOPMENT CENTER, WRIGHT-PATTERSON AIR FORCE BASE, OHIO**

Dr. RICHEY. Mr. Chairman, thank you for giving me the opportunity to discuss the ongoing quality research, the technology development and the infrastructure of the Air Force Research and Development Center, WRDC, which is part of the Aeronautical Systems Division at Wright-Patterson Air Force Base, Ohio.

My prepared remarks have been submitted covering the general aspects of the Air Force science and technology program, so I would like to spend just a few minutes reviewing one particular research establishment, namely WRDC.

The Wright Research and Development Center is the largest research and development center in the Air Force, responsible for about 40 percent of the Air Force technology base. By that we mean 6.1, 6.2 and 6.3 advanced technology development (ATD), of which the total amount of the Air Force is approximately $1.27 billion proposed for fiscal year 1991.

WRDC has about 33 percent of all the engineers in the Air Force working at its in-house laboratories. WRDC is a full spectrum R&D center, providing in-house research in 6.1 and 6.2, with contracted research in these categories, plus 6.3A (ATD), and manufacturing technology, budget category 7.8.

WRDC is an integral part of the Aeronautical Systems Division at Wright-Patterson Air Force Base, therefore, forming one of DOD's largest R&D and acquisition centers. WRDC is a multidisciplinary organization of about 2,500 people, including 1,700 scientists and engineers. Key technologies include airbreathing propulsion, avionics, cockpit technology, flight vehicle technologies, stealth technology and pervasive technologies in materials and microelectronic devices.

In addition to managing the fiscal year 1990 budget of $500 million in 6.1, 6.2 and 6.3 ATD and $85 million in manufacturing technology, WRDC is managing about $250 million from other government agencies, principally, the SDI and DARPA.

WRDC has a strong emphasis on in-house R&D using high-quality researchers and world-class facilities, such as the WRDC materials laboratory, the largest materials research complex in the free world. Our scientists and engineers are conducting leading-edge research in technologies such as polymers, computational fluid dynamics, airbreathing propulsion, gallium-arsenide electronic devices, and neural network artificial intelligence.

In addition to our permanent work force in the Air Force labs, we draw much needed technical expertise from industry and academia, with which the WRDC has close and complementary relationships. With industry, we focus on R&D which is applications oriented and can provide return on investment, both for industry and the Air Force. With academia, we focus on long-term basic research.

We also review about $1.5 billion in IR&D each year.

WRDC is an Air Force R&D center whose roots go back to the pioneering research of the Wright brothers and the Army engineer-

ing corps at McCook Field beginning in 1917. We are able to focus and apply the national and international technology base to Air Force problems, missions areas and their future systems options by working in close harmony with other service R&D establishments, NASA and other government agencies, as well as industry and academia.

We are therefore able to pinpoint needed research and provide the leadership for in-house and contracted work because of a close liaison with the Air Force users, such as Tactical Air Command or Military Airlift Command or Strategic Air Command, through the Air Force Systems Command product divisions, especially ASD, and through our nearby Air Force Logistics Command. This focusing and leveraging of the entire national tech base means that the 1.5 percent of Air Force total obligational authority for science and technology is much more effective than it would otherwise be.

Because we are service managed and funded, we are able to maintain this close contact with the users. We have an annual users' review of our technical program, and their interaction has a direct influence on our program planning, making our technical program much more product focused. We are also able to show that user the application of advanced technologies to his current and future systems to enhance the affordable and effective mission capabilities.

WRDC has a balanced science and technology investment strategy geared toward providing options for future Air Force capability and for solving today's Air Force problems in operations and support. As an example of the latter, WRDC research in non-destructive inspection and fracture analysis of engine compressors and turbines is projected to save $900 million in F100 engine maintenance costs by being able to retire expensive turbine discs at the appropriate time.

An example of the WRDC research being applied to future capability is our technology transition for the advanced tactical fighter in several key areas.

In the longer view, for example, we are supporting the National Aerospace Plane by managing the high temperature materials program, the NASP-funded effort. We can only do this because of our expertise and background in high temperature materials research.

A few other examples of our technology transfers are in this book which I will leave with you after the hearing, and I will be glad to give it to you and your staff. It describes the activities that we have promoting successful transitions.

[A copy of "Wright Research and Development Center - Cameos and Success Stories, Jan. 89–Mar. 90," will be retained in committee files.]

We are able to do this because key leaders understood the Air Force problems and the background and were able to apply their results to Air Force needs. We can think of the Air Force Science Technology Program conducted by laboratories such as WRDC as the front end of the Air Force's system acquisition process. To do this, we are a key player and, in fact, provide a leadership role for many of the DOD critical technologies.

However, in addition we look forward to producibility in manufacturing issues through an aggressive activity focused on manufacturing process R&D and reduced weapons systems cost.

WRDC manages the Air Force manufacturing technology program which is the cornerstone of initiatives to improve producibility, reduce costs and enhance the industrial base. We are now focusing on an integrated product development strategy wherein performance, producibility and supportability are an integral part of our developments in the technologies.

Despite all the accomplishments of WRDC for the Air Force, we know that in the spirit of total quality management we could make significant improvements in our technical leadership, productivity and, most importantly, the quality of technology development.

The most exciting and innovative initiative to improve laboratory quality that I have seen in my nearly 30 years with the Air Force, is the DOD laboratory demonstrationnstration program. I hope you will give it your enthusiastic support because I believe that the kinds of initiatives it embodies will dramatically improve the laboratories' quality, productivity, and their ability to streamline the transition of technology to the users and to the private sector.

WRDC is one of two Air Force R&D centers participating in the lab demonstration project. The other is the Rome Air Development Center at Griffiss Air Force Base. These two laboratories, Mr. Chairman, employ over half of the engineers in the Air Force Systems Command Laboratories. I think this level of involvement, Mr. Chairman, makes it very clear that the Air Force is strongly committed to the lab demonstration program.

At WRDC we formed a team to identify the initiatives in all of the areas that were mentioned by Dr. Herzfeld and Dr. Millburn. We identified some 50 specific ideas, and we are already moving out in the areas that we have local control over. The lab demonstration project is clearly the right signal from DOD and to the Congress that the labs are important to DOD and to the Nation.

This will help us immeasurably to attract and retain outstanding individuals, help us acquire and maintain the quality of research facilities and state-of-the-art equipment. The lab demonstration project will go a long way to creating an environment that will attract outstanding young people to join WRDC in spite of salaries that are generally lower than industry. This is particularly important for Ph.D. researchers.

Even before the lab demonstration initiative, we found many ways to help our in-house R&D program, and they are listed in the remarks also made for the record. We also have graduate students working in the summer in the laboratories, and National Research Council post-doctorates who conduct research for a 1-year period. Additionally, we have university faculty members working full-time, one of the many activities sponsored by the Air Force through the Air Force Office of Scientific Research.

While our number one S&T role is to develop technology to serve the operational Air Force, at the same time many of our technological developments also have civilian, commercial applications. The high bypass fan in the 747 and DC–10 trace their lineage back to

the research and development conducted in our aeropropulsion power laboratory.

Given the budget environment, the Air Force and the private sector must continue to identify and implement processes that more effectively utilize advanced technologies that were developed for military applications, but which significantly contribute to maintaining the United States' technological superiority.

The Stevenson-Wydler Act and the Federal Transfer Act of 1986 clearly helped to create the environment to help make this happen. We are active players in both of these activities. We have the Office of Research Technology Applications, we are participating in Federal laboratory consortium and so-forth, and we have several active CRDAs and more in the process.

Sir, our vision for the future is for the WRDC to be increasingly recognized as the premiere laboratory, focusing technology for Air Force applications while providing leadership at the national and international level of technologies for affordable, effective systems to maximize Air Force capability and to support national objectives.

Examples of our future vision as we approach the 21st century include: no mission aborts due to electronic failure; reliable miniaturized electronics; engines with double the thrust at the same weight; agile and survivable aircraft; artificial intelligence applied to aerospace structures and crew stations; and revolutionary capabilities, materials, and manufacturing processes.

We treasure our heritage of contributions to the Air Force and to the Nation. The future is bright if we maintain a robust science and technology program in times of reduced budgets. To quote General Hap Arnold, Commander of the Army Air Corps in 1944, "The first essential of air power is preeminence in research."

Sir, the 21st century aerospace leadership is at stake. Our Air Force laboratories are absolutely essential in maintaining American technological superiority. Your support is crucial. Thank you, very much.

[The prepared statement of Dr. Richey follows:]

STATEMENT OF
DR. KEITH RICHEY, TECHNICAL DIRECTOR
WRIGHT RESEARCH AND DEVELOPMENT CENTER
WRIGHT PATTERSON AIR FORCE BASE, OHIO

Mr. Chairman and Members of the Committee:

The objective of the United States Air Force laboratory Science and Technology Program is to provide advanced technologies needed by our aerospace forces to maintain a technologically superior warfighting capability necessary to the foundation of our national military strategy of deterrence based on strength. Today, this strategy must be developed in an environment that's changing more rapidly than anyone could have imagined. Although we find encouragement in the large number of positive political and military developments throughout the world in the last year, we still must base our military planning, and by extension, our research and development and acquisition of new systems, on the actual military capabilities of our potential adversaries and not their early proposals or any tendency toward optimistic evaluation of their intentions. The backbone in this planning effort is our commitment to a sound Research and Development program with the Science and Technology Program providing the foundation. We have developed our investment strategy around four major points:

- Maintain Technological Superiority
- Maintain Readiness
- Modify existing systems
- Develop new systems

To accomplish the second, third and fourth of these requires vigorous attention to the first - MAINTAIN TECHNOLOGICAL SUPERIORITY.

The Air Force Science and Technology (S&T) program (of which the technology base is a component) is the cornerstone of our future. The size of the threat to the United States and its allies may be rapidly changing, but we have seen no degradation to

the military quality of that threat. In fact, quite the contrary. We see dramatic evidence of that increased quality in the world-wide availability of highly capable aerospace systems. In this environment, we must continue a broad S&T program from which we can constantly and accurately evaluate threats and provide the technologies required for future system development. This requires both adequate funding and the proper allocation of the funding. The allocation must balance near term and far term technology needs among tomorrow's weapon systems needs, support of today's systems and maintenance of the laboratory infrastructure.

A key part of the Air Force Investment Strategy for the Science and Technology Program is the DOD Science and Technology Program Investment Strategy and the DOD Critical Technologies Plan. The Air Force actively participated in the development of both documents. The DOD Critical Technologies Plan provides focus and definition of important technologies for our laboratories, Industry, and our international partners. To bring these technologies along, we recognize that the OSD staff with their capacity to look across DOD departments is uniquely positioned to provide leadership and focus . We believe that the next step in this process is to merge the DOD Critical Technologies Plan and the DOD Science and Technology Program Investment Strategy into a single document that ties required military capabilities with the technologies necessary to achieve those capabilities. This coupling will provide a defined and auditable linkage between each critical technology and the major long-term military capability goals. It will ensure our S&T program is broad enough to prevent technological surprise, is balanced to meet our users' needs, and provides an advanced warfighting capability. The combined document will help the S&T managers focus on capability goals while balancing their investments in pervasive, enabling, and breakthrough technologies.

While our number one S&T role is to develop technology to serve the operational Air Force, at the same time many of our technological developments will also have civilian commercial applications. Given today's austere budget environment, the Air Force and private sector laboratories must continue to identify and implement processes that more effectively utilize advanced technologies that were developed for military applications but which significantly contribute to maintaining the United States technological superiority. By enacting the Stevenson-Wydler Technology Innovation Act (1980) and the Federal Technology Transfer Act (1986), Congress has helped create the environment to facilitate commercialization of military-related technologies. The Air Force supports these acts and is building the infrastructure necessary for capitalizing on the benefits available from complete implementation.

As mandated by the Stevenson-Wydler act, we have established Offices of Research and Technology Applications (ORTAs) at our laboratories and are active participants in the Federal Laboratory Consortium (FLC). The FLC provides a national network linking laboratories with other Federal entities, state, local, and regional governments, and the private sector. We have found that the ORTAs and the FLC provide the crucial link in the transition of technology information from the laboratory to other laboratories and the private sector.

As ORTAs provide technology information, so the Cooperative Research and Development Agreements (CRDAs) provide a means of transferring information, providing unique facilities, and gaining technical expertise within our laboratories. Currently we have about 20 CRDAs in effect and several more in negotiation. Based on our current experience, we expect the number of CRDAs to expand in the future. The CRDAs are meeting their objective of bringing the Air Force laboratories and non-government laboratories together in joint ventures. However, our Air Force laboratories

and the supporting infrastructure must be maintained to fully capitalize on the benefits of CRDAs.

An example of an Air Force success story concerning CRDAs is the case of the New York Photonics Development Corporation (PDC) in Rome, New York. Photonics, or the use of light (photons) to transmit and process information, is technology which will have tremendous impact on both military capabilities and the commercial sector. Through this cooperative agreement with Rome Air Development Center (RADC), thirteen major categories of photonics research - six large systems, four subsystems, and three families of components, have been identified. The commercialization of these thirteen categories could ultimately reach a combined market potential in the U.S. alone equal to today's total world market of photonics products of $10 Billion annually. For the Air Force, this CRDA revolutionizes, in a synergistic manner, photonics research which will facilitate faster technology development and thus quicker application to advanced systems. For the local upstate New York area, this represents an even bigger payoff in that it provides the opportunity for new commercial activity in the region, both from the center itself and, potentially, from the manufacture of products that reach commercialization.

In addition to our permanent workforce in the Air Force labs, we draw much needed temporary technical expertise from industry and academia with which our Air Force labs have close, complementary relationships. With industry, we focus on that R&D which is application oriented and can provide a return on investment both for industry and the Air Force. With academia, we focus on long range basic research. For example, the Photonics Development Corporation mentioned previously at Rome Air Development Center (RADC), is totally in-house research with no external contractual efforts. We were able to enhance our

technical expertise at RADC by utilizing prestigious civilian "visiting" scientists and engineers. Since January 1988, we have brought in twenty-seven (27) PHD-level scientists and engineers from universities at PDC. At present, there are twelve such scientists and engineers. They were brought on board through the following programs:

University Resident Research Program (URRP)

Expert-in-Science Program

Summer Faculty Program

National Research Council Associates

By the way, schools represented in the before mentioned group include such prestigious names as MIT, Princeton, Carnegie-Mellon, Tufts, etc. These programs allow us to reach into every university in every state to assure a critical mass of expertise in emerging technologies. In addition to these programs, we also have in place programs whereby we "grow our own" experts. The first group of doctoral-level students has been recruited under the Air Force's PALACE KNIGHT program, a program which uses long term full-time training as a tool to recruit promising talent and places them at leading universities.

We have made and are continuing to make many changes to improve the way we do business in S&T. A major new initiative in DOD, aimed at improving the laboratory research environment, is the Laboratory Demonstration Program. The program will select demonstration laboratories that will be used to explore new ways to recruit and retain scientists and engineers, streamline contracting procedures, and improve our aging research facilities. This demonstration program sends the signal that our Air Force laboratories are important to the nation and has us excited all the way down to the bench level scientist and engineer. Two of our centers, Wright Research and Development Center at Wright Patterson Air Force Base (OH) and Rome Air Development Center at Griffiss (NY) and Hanscom (MA) Air Force Bases, have been selected

as the Air Force demonstration laboratories. We are confident that the selected laboratories will be able to demonstrate greater efficiency and improved laboratory productivity. Our goal is to have this program help us in attracting and keeping quality people and in maintaining a high quality research environment.

As we look toward the 21st Century, we see a greater and more pervasive need for our Air Force laboratories to maintain technical excellence. We are at a threshold where we can foresee technological breakthroughs. For example, Hypersonics could revolutionize aerospace and rival the impact of the jet engine on military capabilities and commercial transportation. That is only one example - there are many others - of how advanced technology will change the way the Air Force operates in the 21st Century.

Gentlemen, the 21st Century aerospace leadership is at stake. Our Air Force laboratories are absolutely essential in maintaining American technological superiority. We must direct the future, not react to it. Your support is crucial.

Thank you, Mr. Chairman, for the opportunity to make this statement. I will be happy to answer your questions.

Senator BINGAMAN. Thank you very much.

We are running later than we expected to. Let me just ask a few questions before we complete the hearing.

Dr. Coffey, let me ask your reaction to Professor Deutch's recommendation that some of the laboratories, the DOD laboratories be made GOCO labs.

Dr. COFFEY. What you can do, in fact, what I did while Professor Deutch was talking, was jot down some pros and cons on this issue. The pros that I would come up with are: it would probably solve the compensation problem; it might solve the facilities problem; that is less clear. It will give you more flexibility in personnel administration because it would be outside the Civil Service system. It would allow you to introduce private sector administration, i.e., avoid some of the bureaucracy. My impression, however, is that the bureaucracy noose is closing around their (GOCO) necks as well. Those are some of the pros.

The cons: the issue of their not being government employees, I think, needs a lot of thought. It is not clear that the single mission focus and narrow Industrial Base that produced the GOCO labora-

tories carries over to the Department of Defense. I think that needs to be thought through very carefully. In DOD, you have multiple sponsors, multiple programs and a large Industrial Base. I think there is a degree of complexity there which may not be reflected in the current GOCO arrangements. The complexity and breadth of the DOD program will have a major impact on whether or not contractor employees can effectively and efficiently run DOD laboratories.

The transfer might upset the chemistry that made NRL successful. Nobody really knows how NRL works. We have to be careful that we do not muck around with it too much. I think we have to think that through.

There are practical problems like how we could handle the retirement programs. How would you find a prestigious university to run the NRL? In the case of NRL, I think you would want it run by a university, not by a private profit-making company. You would have to worry about NRL losing its navy focus which has been an important ingredient to the success of the laboratory.

So, I think there are pros and cons. I am certainly not going to render judgment at this point. I think Professor Deutch's comment, "just because something is difficult, is no reason to forever avoid solving the problem," is an important point. I would prefer to see the problem—keeping the place like NRL a great laboratory, solved within the Federal system. On the other hand, if you cannot solve it within the Federal system, then my personal view is you ought to think seriously about the issue of conversion.

I would also predict that if you do not solve it then, within this decade, you probably will be forced into a conversion, just from a practical aspect of keeping the place viable.

Senator BINGAMAN. Dr. Thornton, on one of your slides, you had a statement up there about engineering scientist exchange with foreign countries as I understood what was referred to there. Could you elaborate on that as to what you have done to involve some of your scientists and engineers or to bring forward scientists and engineers to work in the laboratory?

Dr. THORNTON. As I mentioned earlier, particularly in emerging technology, we try to find out where the best is. And in some areas, we have found the best in Europe. We have tied in, particularly, I mentioned, the microelectronics area, where we began to associate with the people in the Cavendish Laboratory in Great Britain, and then began to have their people come over and spend half a year with us and we would go over and spend half a year with them. And during the course of that, we had several joint developments of a product nature that were quite fruitful.

We have done that with some of the other countries as well—sent our people over for a tour.

Senator BINGAMAN. Have you had people involved in any of the consortia in the research efforts going on in Japan?

Dr. THORNTON. In a variety of ways. We have had two of our people over in our foreign office of science and technology and our research office over there for extended tours of duty, where they have worked fairly closely.

We have had a couple of cases where—in fact, in one particular area, we had a personal liaison between a key Japanese scientist in

acoustic wave area and one of our people, and they have run a joint project for a decade, essentially, with spending time in each other's laboratories. In fact, they have jointly patented in that arena and jointly publisned in that arena over that period of time.

Most of the other cases are simply good liaisons that we have had at the working level. And in some cases, I have sent a team to Japan with letters of introduction to people I have known for many, many years and asked for specific information, and they spent enough time in those laboratories then to come back with detailed information on the processes of times, temperatures, and things that were necessary to duplicate results that had been achieved in Japan.

In the future, I think we would expect to do more placement, particularly with some of the programs like Hitachi has, for example, where they have set up one of their laboratories specifically to operate around English-speaking people, and they have offered the opportunity for us to have engineers to come in and work in it. The language is obviously an impediment.

Senator BINGAMAN. Dr. Richey, just let me ask you, on the issue of stability and leadership in the various laboratories, is that a significant problem at your laboratory R&D center?

Dr. RICHEY. Mr. Chairman, I do not believe it is a significant problem. In the WRDC, we have five laboratories and four directorates, two of those are military and seven are civilian. At the Center level, we have a commander, who is military; a deputy director, who is a long-term civilian; and myself, who is a long-term civilian.

So the continuity comes through with the civilians who actually, in fact, direct the technical program of the laboratory. The commander provides overall guidance and provides the close connection in the interaction with the user for his military counterparts.

So we have found over the years, that although there is some change in the military officers, the continuity of civilians carries the program.

Senator BINGAMAN. I have a long list of other questions, but we have run over our time. I appreciate the testimony. I think the testimony has demonstrationnstrated that in each of the services you have some very capable activities going on and a very strong tech base, and we are trying to find ways to help support that. We will continue to and we will probably call on each of you to give us your reaction to specific proposals that are put before us over the next few weeks.

Thank you.

[Advanced questions for the record from Senator Bingaman with answers supplied by Dr. Herzfeld follow:]

*Question 1.* Please describe the structure of the DOD Laboratory Demonstration Program (LDP) and how it relates to any other laboratory management studies or restructuring programs now underway.

Answer. The structure of the LDP is explained in the prepared statement. There are presently no other on-going studies on laboratory management. We do have an R&D Activity Restructuring Study underway but the LDP is orthogonal to that effort. The LDP deals with the infrastructure of the DOD laboratory system: how it operates; the adequacy and quality of support systems such as personnel, contracting, and the physical plant; and the management authority and reporting structure for laboratory directors. The restructuring study, on the other hand, focuses on improved performance and productivity for the R&D activities.

*Question 2.* Have the individual laboratories that will participate in the LDP been selected? If so, phase identify them. On what basis were they selected?

Answer. The prepared statement includes a list of the criteria that Deputy Secretary of Defense Donald Atwood issued to the services in his November 20, 1989, memoranda initiating the program. The statement also includes a list of the 29 selected Demonstration Laboratories. However, for convenience both lists are attached here.

*Question 3.* Please describe the basic LDP implementation approach being used, noting variations between the military services. Did OSD prescribe the basic implementation approach to be used or were the services permitted complete flexibility in selecting their approaches?

Answer. In implementing the LDP the services were tasked to institute specific changes. An OSD-level working group is working closely with designated service representatives to assure a timely and adequate implementation plan. This approach was favored to allow for basic differences in the management structure of the three services. The services have taken seriously the activities of the LDP working group as evidenced by the high level of official representation: Deputy Assistant Secretaries for R&D; Directors of laboratory command structures; and senior staff from service HQ-offices.

*Question 4.* Have the three military services submitted LDP implementation plans to OSD for review and approval?

Answer. The service implementation plans were due to my staff by May 20, 1990. Since that date fell on a weekend, we have extended the deadline to Monday, May 21, 1990. However, in the interim, the service representatives have provided DRAFT copies which my staff are now reviewing. Presently we see no significant or unsurmountable problems except the lack of ST-positions (GS–16 through GS–18) which are limited by law.

*Question 5.* What steps has OSD taken to monitor the implementation of the LDP and to note success and failure?

Answer. The service representatives to the OSD LDP working group developed the "Measures of Success," attached, for evaluating the performance of the program. The Measures of Success were reviewed and refined to meet the needs of OSD in conducting oversight for the program.

*Question 6.* Who in OSD is directly responsible for day-to-day LDP oversight?

Answer. Dr. George Millburn, my Deputy for Research and Advanced Technology is responsible for the day-to-day oversight of the LDP. Additionally, as part of Deputy Secretary of Defense Atwood's Defense Management Review program, we provide monthly reports to Under Secretary of Defense for Acquisition John Betti.

*Question 7.* Is the laboratory consolidation study and the LDP coupled in any way? Is the LDP structured to proceed regardless of the outcome of the DMR laboratory consolidation study?

Answer. The Chairman of the LDP working group is a full-time member of the R&D Activities Restructuring Team and also reports to Dr. Millburn. Additionally, one subgroup of the LDP is assigned to the Restructuring Study Team to provide very tight coordination between the two groups on that subject area. Finally, many of the service representatives are joint members on both teams. The LDP will continue as planned, but selected portions may be included in the restructuring plan as it is developed and as LDP results are available.

[The following attachment is part of "The Department of Defense Report on The Defense Management Review Laboratory Program," dated April 1990, and prepared for the Committees on Armed Services. The entire report will be retained in committee files.]

## DMR LABORATORY DEMONSTRATION PROGRAM

## MEASURES OF EFFECTIVENESS

### Personnel Management

Retention rates of high grade scientists and engineers.

Recruitment of highly-qualified scientists and engineers, both young and experienced.

Time to hire.

Ratio of new hires from highly-rated "Top" universities.

Ability to maintain an effective level of advanced-degree employees.

Ratio of accepted to rejected offers.

R&D CONTRACTING

Improved average time to execute a contract, small purchase, or cooperative agreement while maintaining quality (Procurement Action Lead Time).

Development of technical personnel to be more effective as contract-support coordinators.

Reduction in required reviews, clearances, and documentation.

Increased use of BAA's/PRDA's.

FACILITIES MODERNIZATION

Average time to effect major repairs/construction of new facilities.

Ability to achieve a rate of facility replacement consistent with private-sector laboratory management practices (replacement-rate goal of 50 year cycle).

DECISION AUTHORITY

Technical Director/Commander tenure.

Flexibility/freedom in decision making to operate the lab.

Authority/control over supporting procurement, personnel, supply and maintenance organizations.

Extent of laboratory contracting authority and reduction of mandatory reviews.

LABORATORY PRODUCTIVITY

Applications by industry for licenses of patented technologies.

Average time to renew/acquire research equipment.

Laboratory discretionary research and development funds (the Packard Report recommended a goal of 5 percent to 10 percent of all laboratory funding).

Technical publications recognized by peer review.

Operational/user interface.

[Additional questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR JEFF BINGAMAN

Senator BINGAMAN. I'm very concerned about the viability of the smaller manufacturing firms in the United States—and how we can find ways to keep them competitive with other countries. Do you see any potential for DOD labs to help the smaller firms in the country in this regard?

Dr. HERZFELD. The ability of small businesses to perform research and develop products is indeed an asset for the United States. One way to assist these small businesses is to provide access to the results of research sponsored by DOD. Reports generated as a result of DOD sponsored research that are not classified or otherwise restricted, are made available to the public through the National Technical Information Service. In addition, authorities provided by the Stevenson-Wydler Technology Innovation Act of 1980, the Federal Technology Transfer Act of 1986, and Presidential Executive Order 12591, "Facilitating Access to Science and Technology," facilitate research efforts by non-Federal parties. In accordance with this statutory direction, cooperative R&D agreements (CRDAs) between Federal laboratories and non-Federal parties are treated as cooperation, not procurement, and can be accomplished without the constraints procurement rules often impose. These CRDA's permit research activities that simultaneously allow the pursuit of government R&D objectives and development of technology for commercial purposes. The Small Business Innovation Research Program is another way DOD assists small businesses by providing them with a share of DOD's R&D contract awards.

Senator BINGAMAN. What is your perspective on the impact of the shrinking independent research and development (IRAD) funds available to support the national tech base R&D? Should DOD be thinking about some fundamental restructure to replace those funds so that our national research and development activity doesn't slip as overall defense spending falls?

Dr. HERZFELD. As you recognize, the issue raised here is much broader than IRAD. Defense R&D in its entirety has traditionally fulfilled a special niche in addressing high-risk projects at the extremes of performance and reliability. This has often resulted in high-value spinoffs to the commercial sector. As the total defense effort is reduced it will be important that appropriate provisions be made for structuring overall national R&D, both Federal and private, so as to assure that the kinds of R&D traditionally performed by DOD programs are not unduly degraded.

Senator BINGAMAN. Do you foresee any possibility to implement the China Lake personnel system across the entire DOD Lab structure as a part of the DMR lab consolidation effort?

Dr. HERZFELD. To extend the China Lake personnel system will require legislative action. In moving in that direction for the Demonstration Laboratories, DOD will seek broad enough license to allow wider implementation at a later date should that appear desirable. It should be recognized, however, that while the China Lake personnel system offers significant advantages, it will not ameliorate the large divergence in salary levels between the public and private sectors for scientists and engineers.

Senator BINGAMAN. As the senior civilian manager at each of your respective laboratories, what is the single most pressing problem that you are facing in maintaining the viability and effectiveness of your organization?

Dr. COFFEY. The single most pressing problem facing the Naval Research Laboratory (NRL) in maintaining its viability and effectiveness is that of renewing its scientific and technical workforce over the next decade. The need for this renewal is most easily understood by examining Figure 1, which displays the number of NRL branch heads eligible for retirement over the next 20 years. The figure demonstrationnstrates quite clearly that 70 percent of current NRL branch heads will be eligible to retire by the turn of the century. Experience indicates that the branch heads will retire upon reaching eligibility. The branch is the basic entrepreneurial unit at NRL. Therefore, the fate of the branches determines the fate of NRL. The data presented in Figure 1 demonstrationnstrates that there will be massive, but natural, turnover amongst the senior scientific and technical leadership at the Laboratory during the next decade. Renewal of the NRL workforce will be complicated by two factors. The first factor has to do with compensation for the most talented scientists and engineers. The compensation problem can be understood by examining Figure 2. This figure displays data collected by the American Institute of Physics, regarding salary paid to physicists holding the doctor's degree as a function of years from the Ph.D. The area of most concern to NRL is its ability to compete for the best scientific and engineering talent. Presumably the best talent is represented by the 90th percentile curves in Figure 2. The curves indicate that the Federal Government falls very rapidly behind industry, the FFRDC's (GOCO's), and the universities as a function of experience (years from the Ph.D). Since the data shown in Figure 2 were collected in 1987, the absolute values are not important. One should consider only the relative position of the Federal Government, which has certainly not improved since 1987. The lag of Federal salaries with industrial salaries is not surprising. Perhaps more significant is the lag of Federal salaries relative to FFRDC (GOCO's) and universities. If only salary were considered, Figure 2 indicates that the Federal Government is competitive only for the lower half of the national talent pool of experienced Ph.D.s in physics. The compensation situation, of course, is more complicated than this. True compensation involves more than money. The psychic income relating to the institution's reputation, the quality of its program, the quality of its facilities, the quality of one's colleagues, and the general quality of life must be considered. Nevertheless, Figure 2 illustrates quite graphically that (especially for experienced and highly talented people) it takes a great deal of psychic income to make up for the difference in real income when one compares government salaries with industry, GOCO's, or universities.

The second factor which complicates the renewal of the NRL scientific and engineering workforce is the conversion from those employed under the Civil Service Retirement System (CSRS) to those employed under the Federal Employees Retirement System (FERS). The current NRL senior scientific and engineering workforce is stabilized by the "golden handcuffs" which exist in the Civil Service Retirement System. Since the FERS system cuts those "golden handcuffs," there is a great deal of concern as to whether or not the senior workforce of the year 2000 at NRL will be as stable as the senior workforce which exists today. My expectation is that the senior workforce of the year 2000 will not be stable unless something is done to narrow the pay gap for the most talented people. In addition to achieving some narrowing of the pay gap, the Federal Government should pay special attention to enhancing the psychic income mentioned above.

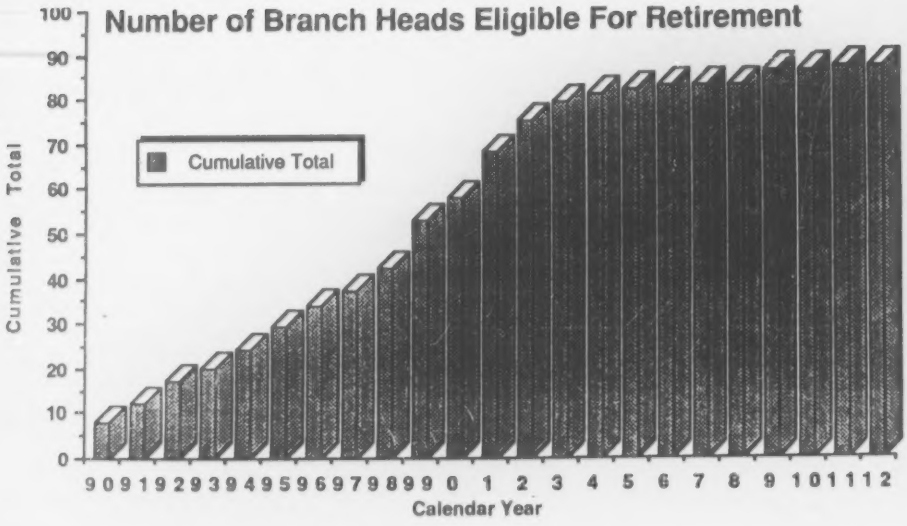
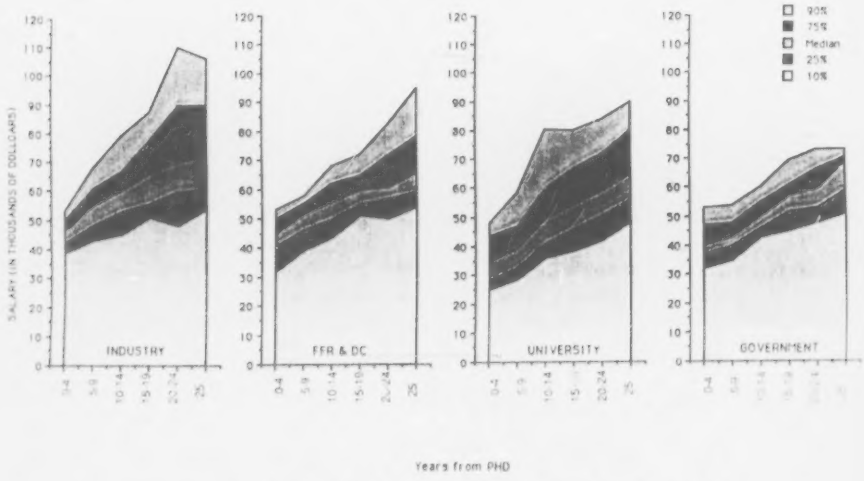



Fig. 1




SALARY STRUCTURE IN INDUSTRY, FFR & DC, UNIVERSITY BY YEARS FROM PHD, 1987

SOURCE: AIP MEMBER SURVEY, 1988

Fig. 2

Dr. THORNTON. It is critically important that the United States achieve and maintain a world leadership position by staying at the cutting edge of rapidly advancing technologies. It will be increasingly difficult to meet the defined, focused, high priority military electronic systems needs in a budgetary environment of significantly reduced resources. Therefore, the single most pressing problem that government laboratories face today is program stability at the laboratory level. Stable, long-term funding of Research and Development (R&D) is needed. Time and effort are wasted when engineers have to resell their programs each year through several layers of bureaucracy.

In today's fast changing environment, laboratory directors also need at least 20 percent of their funds ear-marked as completely discretionary, to take advantage of new technology opportunities without having to justify efforts in advance.

Dr. RICHEY. Our most pressing problem is maintaining the R&D infrastructure—the people and facilities. We need to maintain the high quality of people that we now have. This will be increasingly difficult if R&D budgets decline. Initiatives included in the DOD Laboratory Demonstration Program will provide the needed flexibility to hire and retain top quality scientists and engineers. The military construction process is inexorably slow. More flexibility is needed to renovate and replace facilities and equipment.

Senator BINGAMAN. What do you perceive as the biggest problem area that the Laboratory Demonstration Program may provide relief?

Dr. COFFEY. The Laboratory Demonstration Program provides a remarkable opportunity to address the problem discussed in Question #1, namely, how to renew the NRL scientific and engineering workforce over the next decade. This opportunity should be taken seriously. As a minimum, the personnel system placed in operation at the National Institute of Standards and Technology (NIST) should be extended to NRL and other selected laboratories. The NIST system resulted from Public Law 99-574. The plan in operation at NIST would be far more effective in assisting NRL in renewing its workforce than either the current Civil Service System or the system which has been referred to as the "China Lake" experiment. A more radical but perhaps even more effective approach would be for the demonstrationn project to request legislation to provide the Secretary of the Navy employment authority for NRL and other selected laboratories similar to that provided for the Uniformed Services University of the Health Sciences under Public Law 92-426. A still more radical approach would be to convert NRL to a GOCO laboratory. Although a recommendation has been made to this effect, it is clear that considerably more discussion and analysis would be required before one could assess the effectiveness and viability of such a conversion. It is our view that a significant change in the employment authority which is operative at NRL is required. The Demonstration Project is a logical vehicle through which to request this authority. This is, in fact, the biggest problem area in which the Laboratory Demonstration Program could provide relief.

Dr. THORNTON. The Laboratory Demonstration Program will provide, for the first time, a legal mandate under which laboratories can successfully negotiate with their servicing organizations to create an exceptional operational environment tailored to the needs of research and development and/or to legally supplement in-house activities with industry competitive contractual services. This direction to the services should result in major improvements across-the-board in classification, recruitment, and retention; in procurement and purchasing of parts and equipment; and in day-to-day support. The Laboratory Demonstration Project has the potential for permitting laboratory directors greater degrees of authority and responsibility for independent decision making along with innovative, timely actions in many technical, management, and administrative areas.

Dr. RICHEY. The Laboratory Demonstration Program could conceivably result in solutions for a range of laboratory difficulties. Indeed, many of our proposals at WRDC under the Laboratory Demonstration Program are aimed directly at our most pressing problem mentioned earlier, the maintenance of our laboratory infrastructure—people and facilities. For the "people" aspect we propose streamlining personnel practices and giving managers broader authority, reducing burdensome procurement regulations to improve quality and free-up more time for scientific work, and improving responsiveness off the laboratory supply system. For upgrading and replacing facilities (which includes laboratory equipment), we are proposing additional flexibility. These improvements should significantly improve in-house laboratory research quality and productivity.

Senator BINGAMAN. Numerous studies, including the 1987 DSB summer study, contend that DOD is often not able to recruit and retain the best scientists or engineers graduating from college. (1) Do you agree with this assessment? (2) Are you now able to recruit enough new scientists and engineers to fill your vacancies? (3) If so, can the DOD labs fill its entry level technical positions with graduates who are not in the top tier of their graduating class and maintain their current level of effectiveness?

Dr. COFFEY. The Naval Research Laboratory, because of its outstanding reputation, continues to attract good scientists and engineers graduating from college. However, the difficulty of recruiting the best scientific and engineering talent continues to increase and has become a major concern to the Laboratory. Figure 3 illustrates the recruiting problem at NRL for scientists and engineers. This figure analyzes the pre-offer declinations which NRL has experienced over the past several years. By pre-offer declinations, we mean those individuals who were approached for employment by NRL, and who stated they did not wish to receive even an offer

from NRL. The upper display categorizes these pre-offer declinations from "least qualified individuals" to "best qualified individuals." Roughly, 20 percent of the least qualified individuals state they do not wish to receive an offer, whereas nearly 70 percent of the best qualified individuals state that they do not wish to receive an offer. The good news is that 30 percent of the "best qualified" individuals state that they would be prepared to receive an offer of employment from NRL. The Laboratory is living off this 30 percent. It is generally agreed by the leadership at NRL that the number of "best qualified" individuals who are prepared to receive an offer from NRL has been a declining function of time. In all likelihood, the number of best qualified individuals who are prepared to receive an offer from NRL will continue to decline until something is done with respect to the compensation problem. This is illustrated by examining the lower half of the display in Figure 3, which indicates that the most important reason for pre-offer declinations is salary. Therefore, while the Laboratory does not agree with the assessment stated in question 3, the Laboratory does agree with the concerns which led to this assessment. If the concerns are not dealt with, then at some point the assessment stated in question 3 will apply to NRL. At the present time, we are able to recruit enough new scientists and engineers to fill our vacancies. The Laboratory's position has been that we will fill scientific and engineering vacancies only with individuals who are qualified to do the jobs. This position has led to some vacancies going unfilled. However, by and large, the Laboratory has been able to fill its vacancies. It is not necessary that the Laboratory fill all of its entry-level technical positions with graduates who are in the top tier of their graduating class. The Laboratory must, however, be able to capture and retain enough technical graduates who are in the top tier of their graduating classes, such that the Laboratory can maintain its scientific and technical leadership.

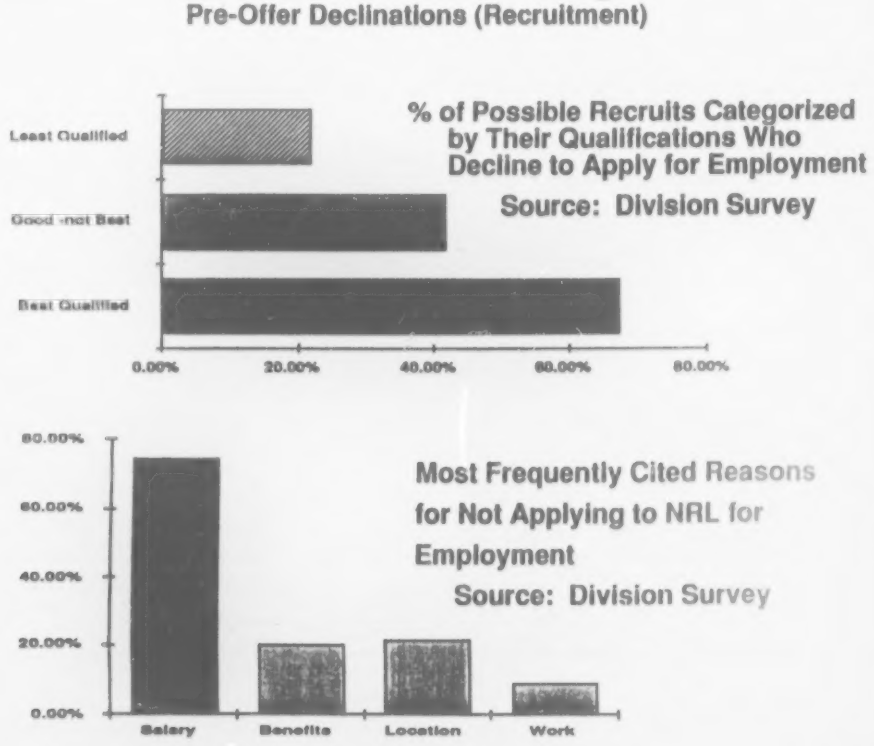



Fig. 3

Dr. THORNTON. (1) In a global sense, the 1987 DSB Summer Study is correct in its contention that DOD is often not able to recruit and retain the best scientists and engineers graduating from college. This challenge has been successfully met by providing a work environment that is fully comparable to that of first-rate private

sector organizations and offers advantages in the range of experimental options and access to the technology community at large.

(2) We have frequently been able to recruit top engineers and scientists in spite of lower-than-competitive salaries due to a quality work environment and the opportunity to have an impact on our country's needs. Intensive laboratory-university interaction has provided successful recruitment (our engineers giving seminars and students doing their graduate work in our laboratories).

However, two major stumbling blocks remain to effective across-the-board recruitment. These include the direct hire authority which should be provided to the R&D managers who have the expertise to identify, evaluate and acquire top scientists and engineers for specific fields of endeavor through recruitment, and contact with universities, industry and academia. Otherwise we lose candidates who go elsewhere waiting to be brought on board. The present system limits salaries offered engineers/scientists, and laboratory and Division Technical Directors.

Recruitment and retention of top engineers and scientists at any salary depends on the ability to provide:

a. Top facilities.

b. A challenging, creative work environment.

c. Cooperative high level projects or critical emerging technology projects.

d. Shorter entry time from recruitment to time on-board.

e. Shorter review periods for promotion, based on performance.

f. Expansion of dual-ladder system to provide a true opportunity for outstanding Scientists and Engineers (S&E) to achieve equal status and salary to that of upper management and Senior Executive Service (SES) personnel.

g. Continuing to expand the licensing of our patents' to the commercial market whereby S&Es can receive royalties.

(3) We must recruit and retain qualified top S&Es to maintain a competitive edge in the international market of today. However, history and experience provide evidence that graduates who are not necessarily at the top of their class can still be effective, capable, and productive employees. It requires good supervision that provides technical direction; a mentor who truly provides guidance, and a personal and professional interest in the individual; opportunities for additional training, both in a formal sense and on-the-job; and rotating assignments that enable the individual to find his or her best location.

Dr. RICHEY. WRDC doesn't agree with the assessment that we're not able to recruit and retain high quality graduates, but it's an area that requires constant vigilance. We recruit by emphasizing the outstanding quality of work done in WRDC, and the unique facilities and equipment available for in-house research. On this basis, we can successfully recruit enough top-level graduating scientists and engineers to fill our vacancies. A recent example of our ability to recruit is the high-quality of scientists and engineers recruited under the first year of the Palace Knight Program. The average grade point average was about 3.5 of a possible 4.0. If we should reach the point where, due to salary differences between government and private industry and R&D budget cutbacks, we were unable to recruit the top-tier students, we would be concerned about maintaining quality and effectiveness of our research.

Senator BINGAMAN. What percentage of your research and technology work is performed directly by your laboratory personnel versus being contracted out? Do you believe this is about the right ratio, or are you restricted from doing more in-house by lack of qualified personnel, facilities or equipment?

Dr. COFFEY. The percentage of research and technology work which is performed directly by NRL versus being contracted out depends upon the category of money. For example, at the 6.1 level, approximately 90 percent of the program is performed in-house. This is because the purpose of the 6.1 program at NRL is to maintain an in-house cadre of scientists working basic research topics of interest to the Navy and to DOD. The Office of Naval Research directly funds the university community in the area of Defense Research Sciences. It is therefore not necessary that NRL have a significant out-of-house program at the 6.1 level. At the 6.2 level, however, the situation changes. In this case, the Laboratory conducts about 50 percent of its 6.2 program at NRL and 50 percent of its 6.2 program outside of NRL. Some of the 6.2 money, which is going outside of NRL, funds activities at other government laboratories, while most of it goes to private contractors. Significant contractor involvement is required at the 6.2 level, since this is one of the principal methods which the Laboratory uses to transition technology to the private sector, and for maintaining contact with technology development activities within the private sector. As one moves to still higher categories of money, one finds that the fraction of work which is contracted out increases. This has more to do with the nature of the work than

with the lack of qualified in-house personnel. At NRL, we expect that as the work moves from basic research toward more applied programs, the fraction of work performed in-house will decrease, while the fraction of the work performed externally will increase. We see this as necessary for performing technology transfer. It is difficult and perhaps dangerous to say that a particular in-house/out-of-house ratio is appropriate, since the proper ratio is a function of the category of money and the type of program involved. At NRL, we believe that the current distribution of work between in-house performers and out-of-house performers is approximately correct.

Dr. THORNTON. The ratio of in-house to contractual research and development in the Electronics Technology and Devices Laboratory (ETDL) varies between 60:40 and 40:60 depending on the status of major programs such as Very High Speed Integrated Circuit (VHSIC), Microwave Millimeter Wave Integrated Circuit (MIMIC), Strategic Defense Initiative (SDI), etc. We believe this to be a good ratio and a productive one. This laboratory maintains up-to-date state-of-the-art facilities and equipment, which is a prerequisite for attracting and retaining a high-quality technical staff. We are not restricted from doing in-house, mission-focused work by a lack of either qualified personnel, facilities, or equipment. Several Laboratory Command (LABCOM) facilities such as the Pulse Power Center at Fort Monmouth, Nuclear and Electromagnetic Simulators, Ballistic Ranges, etc., are unique in the United States and serve as national resources that are available as appropriate to other Government organizations, industry and academia.

Dr. RICHEY. Our scientists and engineers in WRDC spent about 60 percent of their time on in-house research and support to technical problems arising in the operational Air Force, and about 40 percent of their time monitoring contracts with industry or universities. We believe this is about the right ratio because it allows for a good interaction between in-house and contracted R&D. On a dollar basis, about 20 percent of the income (from all sources) to WRDC is spent on salaries and equipment, with about 80 percent going on contracts to industry and academia. We don't feel that we're overly restricted from doing more in-house work by lack of qualified people, facilities or equipment; however, it takes constant management attention to maintain the right balance.

Senator BINGAMAN. It appears that each of your laboratories are doing a good job of transitioning your developments to industry. What lessons have you learned that are permitting you to do this? What recommendations in that regards do you have for the committee?

Dr. COFFEY. There are various ways to accomplish technology transfer, ranging from publication of the results in the scientific and technical literature, to contracting specifically for the transfer of an NRL developed technology, to entering into cooperative arrangements with private parties, such as through cooperative research and development agreements. All of these methods work. Which method is most effective often depends upon the state of development of the science or technology. For those items which are ready for transfer in the near term (for example, the next several years), then the most effective way to transfer them is to have close working contact among the government laboratory employees who are developing the technology and those individuals in the private sector who are going to receive and market the technology. This close interaction should occur as soon as possible in the development cycle in order to avoid reinventing of wheels later on.

Dr. THORNTON. We have learned much. For example, every technology development in the ETDL has a predetermined transition plan (transition mechanism) designed to transition directly into industry test beds and into industry demonstration projects, tailored to the needs of planned system demonstrations. To be effective, teaming with industry and the system developer must begin at the start of an R&D project rather than at the end when NIH (not-invented-here) postures have set in and there is a reluctance to change.

LABCOM has successfully implemented the Stevenson-Wydler Technology Innovation Act of 1986 and the related Executive Order of 1987. ETDL alone has effected seven legal negotiated Cooperative Research and Development Agreements (CRDAs) with industry, in order to transfer high technology from ETDL to the private sector. Seven additional CRDAs are now being formalized.

Our goal is to meet military needs while fostering development with the commercial economy to insure the economic success and therefore the military success of the United States.

ETDL has successfully transferred important technology to 18 emerging small businesses in recent years to ensure their continued operation through our Small Business Innovative Research Program. Our experience suggests that often it is in small businesses that new inventions and innovative ideas will take hold with the products then migrating into larger company engineering efforts.

Our engineers work and interact with customers through conferences/symposia and workshops to keep abreast of the needs if industry, and where our technology fits into the commercial market place. Our technology transfers go to universities as well as industry and other government agencies.

In executing the role as a "Steward of the Nation's Resources," we maintain an aggressive program of utilizing technical information from the United States and the world to leverage R&D and facilitate technology transfer. Commercial, government and in-house electronic databases provide R&D managers with instant access to vast amounts of national and international information that serve as the basis for effective planning, execution and technology transfer of Army R&D programs. Our global approach to technology planning and development has included a dozen or more informal transfers of key technologies from Japan or Europe via our scientists and engineers working directly in concert with their overseas counterparts.

Besides technical information, we systematically search international databases for technology, procurement, and market intelligence reports and obtain information on domestic and foreign technology and weapons systems.

In addition to the lessons learned above, further recommendations are: There must be an ongoing interaction and dialogue on a peer level between industry and government laboratories, and each must have an in-depth awareness of the other's capabilities. Government laboratories need to know industry's needs and what developments are "showstoppers" that inhibit systems developments and prevent the fielding of reliable, cost-effective systems. Industry engineers spending time in the government laboratories, and assigning government engineers to industry for orientation leads to the development of mutual respect and an understanding of each other's problems.

Industry should look upon government laboratories and their professional staff as peers who can help them meet commitments, solve problems, and even enhance profitability. Industry and government organizations must be convinced that government-industry joint efforts are a synergistic mechanism that has great potential for maximizing return-on-investment. There needs to be real time spin-offs from military developments into the commercial and consumer markets and spin-ons from the commercial areas to the military.

The Congress should continue to emphasize the role of the laboratories to provide leadership in fostering the collective application of world-wide technology to meet U.S. defense needs.

The Defense Industry and Technology Subcommittee can play a productive role by keeping industry informed of government laboratory capabilities and assuring them that working with government laboratories in transitioning products of mutual interest and importance has tangible benefits for industrial organizations as well as the government.

Dr. RICHEY. We don't have any specific recommendations to the committee. There are enough mechanisms in place to enhance transition of technology; we just need to make sure that we use them to the fullest extent. We believe we have been successful in transitioning technology relevant to Air Force problems because our close tie to the users. We transition technology through industry to the users by defining programs that will benefit the user; that is based on an on-going dialogue with the user, and our interpretation of the user's needs. We are also able to take a long-term look at technology development to help focus our technical programs. For small businesses and the private sector, WRDC is very active in the Small Business Innovative Research program, the provisions under the Federal Technology Transfer Act of 1986, and including technology transfer through the Federal Laboratory Consortium and our WRDC Office of Research and Technology Application (ORTA). Finally, we are active participants in a wide variety of State and local mechanisms for technology transfer to the private sector. We emphasize dual-use of our technology base wherever possible.

Senator BINGAMAN. I believe that it is fully understood now that the United States no longer is the only technological superpower in the world and that it is being beaten as an economic competitor in many areas. Do you feel that the DOD laboratories have any responsibility to help the United States in this area and, if so, how do you see yourselves exercising these responsibilities?

Dr. COFFEY. The issue of economic competitiveness is a very complex one, involving many factors of a policy nature which are beyond the ability of the Naval Research Laboratory to advise upon. It is clear, however, that the Naval Research Laboratory does have a responsibility within its mission to contribute in the area of economic competitiveness. There are, for example, developments which come out of the defense research carried on at NRL which have clear commercial impact. Several examples of this were mentioned in my official statement. When such developments

occur, NRL believes that it has a responsibility to attempt to transition these developments to the commercial sector. The appropriate vehicle for transition will vary with the development. In some cases, the establishment of a formal manufacturing technology program would be appropriate. The Laboratory has participated in such programs many times. In other cases, the establishment of a cooperative research program with the appropriate private party is the proper vehicle. The Laboratory has several such projects underway and expects to see the number of these grow in the coming years. The current concerns with economic competitiveness will undoubtedly accelerate the rate at which these cooperative joint agreements occur.

Dr. THORNTON. It is certainly true that the United States is far from the only technological superpower, and in many areas the United States is not the primary superpower. Today only one-third of the presentations on new solid state circuits at international conferences and a minority of patents are of U.S. origin. The effect this has on the economic well-being of the Nation now and in the future is a matter of concern for all America, including DOD laboratories. DOD laboratories can and should be responsible in helping the United States maintain the required technology leadership to meet military and related commercial technology base needs. A great many new electronic technologies that have emerged over the past 40 years were initially nurtured through DOD laboratory efforts, with subsequent military and commercial applications. Today DOD laboratories are even better positioned to play such a role. They can do this because they are in a unique position, interacting with industry and academia at the cutting edge, coordinating their talent and expertise to foster large R&D projects where necessary, and teaming with industry and academia and other government agencies to provide the leverage that DOD resources could not accomplish alone.

For example, ETDL has initiated and implemented an "open laboratories" policy whereby academic and industrial personnel are strongly encouraged to engage in on-site cooperative efforts with government scientists and engineers. They also have negotiated such efforts through agreements with the National Science Foundation, the New Jersey Commission on Science and Technology and other government agencies and industry.

Nearly every project is executed as national or international team efforts, capturing the best engineering talent from other organizations into consortia that have the critical mass of resources needed to compete globally in supplying defense needs while, at the same time, supporting and teaming directly with an infrastructure of smaller, highly innovative research organizations working in emerging technologies. Nearly 180 professors and students have been/are engaged either full- or part-time at LABCOM at Fort Monmouth (at no cost to the government), working in concert with government in-house researchers to address specific technological barrier problems.

Dr. RICHEY. We believe the key area where we are falling behind is in manufacturing technology and materials processing, rather than in technologies across-the-board. Of course there may be some areas where economic competitors are ahead or gaining rapidly. WRDC, as the Air Force's director of the Air Force Manufacturing Technology program, takes seriously its responsibility to improve the industrial base and help maintain economic viability. This manufacturing technology program has been successful and is highly acclaimed; its contributions to the competitiveness issue is well documented. As an Air Force organization developing technology, we believe WRDC has a role to play in concert with other government organizations and the private sector to maintain U.S. economic competitiveness. Our emphasis on dual use technologies, cooperative research and development agreements (CRDAs) with both large and small companies will help to transfer technologies to bolster economic competitiveness.

Senator BINGAMAN. Admiral Watkins has made improving science and technical education one of his, and the Department of Energy's, top priorities. The DOE national labs are now heavily involved. What role do you believe the DOD in-house labs should play in promoting science and engineering education in America?

Dr. COFFEY. The Naval Research Laboratory has always believed that it has an important role in promoting science and engineering education. The Laboratory is a major employer of scientists and engineers and as such, is very dependent upon the science and engineering education program in America. The Laboratory carries on a significant number of programs ranging from outreach programs to elementary and secondary schools to employment programs, such as postdoctoral appointments and high school apprenticeship appointments. For example, the Laboratory employs, through the National Research Council and through the Office of Naval Technology approximately 100 postdoctoral degree scientists. The Laboratory also employs approximately 100 selected high school students during the summer months through

the Science and Engineering Apprenticeship Program. DOD laboratories, because they maintain significant technical staffs and possess significant scientific and engineering equipment, are an important source of hands-on experience, which can significantly influence youngsters regarding their decisions to make careers in science and engineering.

Dr. THORNTON. The Army believes that its current role in promoting science and engineering education in the United States of America is appropriate and in concert with DOD's mandate that such efforts should be applied in support of the Army's mission. Presently the Army's efforts in this area occur at several, interrelated levels. These levels focus on high school students, high school faculty, college and graduate students, Army scientists and engineers, post-doctoral candidates, University and College faculty and collaborative scientific efforts between various members of these groups. Specifically, these efforts include the following types of activities:

(1) Army laboratories participate in the "U.S. Army Summer Associateship Program for High School Science and Mathematics Faculty," In 1989, for example, this program had 128 participants distributed among 32 Army laboratories. The objectives of the program include the following: Provide a working exposure to Army research and development activities in a laboratory environment; develop a familiarity with the professional life of scientists and engineers; acquire an experience base from which to counsel and encourage their students to undertake and continue science and mathematics curricula; exposure to scientific problems that are of interest to the Army. A similar program, called "U.S. Army Summer Faculty Research and Engineering Program," also exists for faculty of U.S. Universities, Colleges and Technical Institutions. This program is designed for collaborative research and exchange of information between faculty and Army laboratory scientists and engineers. In 1989, there were 107 faculty members enrolled in this program involving 29 Army laboratories.

(2) Every summer Army laboratories participate in the "Summer Science and Engineering Apprenticeship Program for High School Students." This year the program involves 650 high school students distributed over 30 laboratories. Students in this program are each assigned a mentor (a laboratory scientist) who assigns and guides an apprentice through a scientific project.

(3) Army laboratories have numerous programs that maintain and enhance the formal educational level of Scientific and Engineering (S&E) personnel.

(4) A number of the Army laboratories have intensive National Research Council (NRC) post-doctoral and senior faculty programs.

(5) The Army supports the education of graduate students in science and engineering through the NDSEG Fellowship program and the University Research Initiative (approximately 164 participants in 1989 and 136 in 1990).

(6) The Army sponsors 12 Centers of Excellence (COE) in mission related areas of science and engineering. These University Centers are managed by the Army Research Office (ARO), in association with the Army laboratories, and provide graduate fellowships to over 60 graduate students annually. Additionally, the Army supports the education of graduate students functioning as research assistants to individually supported University investigators funded by the Army to carry out research relevant to the Army mission. The number of full-time graduate students supported in this manner exceeds 1,400 annually.

Dr. RICHEY. Better science and engineering education will benefit DOD in-house labs in the long run, both in terms of our in-house and contracted R&D programs. We are generally in a supporting role with other agencies, but we at WRDC work vigorously with the local high schools and universities to encourage students, particularly minorities and females, in science and engineering. For example we support Wright State University in Dayton in a summer high school apprenticeship program called Wright-Stepp. We are providing instructions and facilities under this highly innovative S&E education intervention program.

Senator BINGAMAN. As you know, this subcommittee has been very active in instigating top level critical technology planning in the Department of Defense. How adequate do you judge the top level technology planning in your respective services to guide your laboratory's activities? What recommendations would you give us to improve the technology planning process?

Dr. COFFEY. We believe that the top-level technology planners in the Department of the Navy are well aware of the significant technology opportunities and challenges which confront the Navy and the Nation. If one examines the current situation, one finds a large number of science and technology studies which prognosticate on the future in the various sciences and technologies. Indeed, one must be careful that one doesn't become so wrapped up in the planning process that we become planners rather than doers. The area which needs the most help is that of integrat-

ing what is going on in science and technology nationally and internationally, such that wheels are not unnecessarily reinvented. The days when any organization (be it a company, a government laboratory, a university, or indeed a nation) can be totally self-contained in its scientific and technology enterprise are past. Our organizations must depend upon, benefit from, and exploit the scientific and technical developments of other organizations if we are to keep pace. The fields of science and technology are simply moving too rapidly for any of us to be able to go it alone and still stay in the race. We are in fact all but players in a large science and technology process. Our ability to keep up with what is going on is adversely affected by the level of increasing specialization which has taken place in science and technology. The technology planning process needs to find a more effective way of keeping the specialists informed of developments outside of their specialty, which can have a significant impact on the advancement of their specialty. It is possible that some solutions to this problem may come through the development of intelligent computer systems, which can read and interrelate the literature of different disciplines. More likely, the solution will involve the training of scientists and engineers who are capable of moving among disciplines. It is difficult to find individuals who can do this effectively and with authority, yet they are desperately needed.

Dr. THORNTON. The Army has created the Army Technology Base Master Plan (ATBMP) to guide the technology planning within the Army research, development and acquisition community. The ATBMP, which is resource-constrained and linked to the modernization plans, identifies the technologies which the Army believes will have significant impact on future warfighting capabilities. The Army's Key Emerging Technologies in the ATBMP are a subset of and complement to the Department of Defense (DOD) Critical Technologies Plan. It also provides key milestones in the technology base program for timely transition/insertion of those capabilities into the next generation and future systems for the Army. The ATBMP was first published in 1989 and is being revised to reflect the current views of the Army of the future and the necessary research and technology.

The planning methodology requires a closer definition and understanding of emerging technologies. This is the mission of the laboratories. The laboratories and the R&D Centers work together with the Army Training and Doctrine Command and force development elements to hypothesize future high leverage systems made possible by emerging technologies. Finally, future battles are fought by laboratory and center directors and soldiers at all levels in War Games in a variety of worldwide scenarios. Results of these studies are then fed back to the planning process and to the allocation of resources to critical technologies.

To improve the planning process, a major requirement is for program stability. The Army is protecting the research (budget category 6.1) and exploratory development (budget category 6.2) phases of the mission portion of the technology base by achieving a 2 percent real growth in fiscal year 1992 and fiscal year 1993 with 0 percent real growth. Another requirement for improving the technology planning process is the need for good people who are in good facilities. Recruiting and retaining quality people, military and civilian, are key to improving the technology planning process. The Army, in concert with the DOD Laboratory Demonstration Program and ongoing DOD consolidation studies, is emphasizing the people and the facilities in its reorganization plans.

It is strongly recommended that the DOD critical technologies should be integrated into a DOD Technology Base Master Plan similar to the Army's Technology Master Plan. The DOD Technology Base Master Plan should contain our strategy for supporting basic and applied research, advancing the DOD critical technologies, and supporting a robust advanced technology demonstration program so that we may properly evaluate and downselect among competing technologies and advanced concepts. This plan should serve as a capstone document, providing DOD top-down defense guidance to the services and DOD technology based agencies. As the Army Technology Base Master Plan has shown, releasing such a DOD plan to industry and academia will also help shape their investment plans. It is essential that such a plan be resource constrained in order for it to be useful guidance as opposed to simply being another advocacy document which does not fit budget realities. Such a DOD Technology Base Master Plan may be periodically reviewed by an independent expert body such as the National Academy of Sciences or the Defense Science Board. This will help keep the document current. Finally, progress by the services should be measured by a comparison against this Master Plan, during the annual Office of the Secretary of Defense (OSD) reviews.

Dr. RICHEY. The top-level technology planning in the Air Force is generally good. It sets the tone, but allows flexibility for interpretation at the laboratory level. The general guidance starts with the Air Force Acquisition Executive, Mr. John J.

Welch. Air Force Systems Command provides guidance through our reviews and investment strategy process, so that we achieve consistency between the bottoms-up and top-down processes.

We believe that the next step in critical technology planning is to merge the DOD Critical Technologies Plan and the DOD Science and Technology Program investment strategy into a single document that ties required military capabilities with the technologies necessary to achieve those capabilities. This coupling will provide a defined and auditable linkage between each critical technology and the major long-term military capability goals.

With regard to critical technologies, we believe that the current process of coordination by OSD staff specialists in Dr. Millburn's office works well, except that they should have improved cognizance over technology programs in DARPA and SDIO in order to help coordinate the total picture. Making an individual service the "agent" for a DOD critical technology would not be recommended for many of the pervasive technologies because all the services need to work in these areas in a coordinated fashion.

Senator BINGAMAN. Another major area of concern is the replacement and renovation of laboratory facilities. How do you rate the overall quality of the research facilities in your laboratories? Are there any areas of scientific research that you should be working on but are unable because of problems with your existing facilities?

Dr. COFFEY. The area of laboratory facilities is one of key concern to NRL. The facilities which you possess determine not only the work which you are capable of doing, but they also play a key factor in the psychic income mentioned in earlier questions. Many scientists and engineers will accept some level of pay disadvantage if they are able to work with first-rate state-of-the-art facilities. In the case of NRL, I would rate about 50 percent of the facilities as being totally adequate for the work which we are conducting in them. The remaining 50 percent, I would place in the marginally adequate category. I do not believe that there are any areas of scientific research which we are not working on because of problems with our existing facilities. The Laboratory has utilized its flexibility as an industrially-funded activity to conduct a significant renovation program aimed at providing facilities which will permit us to conduct research which we believe we should be working on. Nevertheless, this renovation process does suffer from a degree of inefficiency. For example, many of the spaces which are being modified were never designed in the first place with the vibration isolation or cleanliness requirements, required by modern research. The discretionary limits placed upon us severely restrict the scale of renovation which can be accomplished. In some cases, the maintenance costs for old facilities exceed, in an integrated sense, the cost of simply replacing the facility with a new facility, yet military construction limitations can sometimes prevent rational utilization of the renovation funds. The result can be that some facilities are maintained, when it would have been cheaper and more effective to use the maintenance funds to simply replace the facilities. There are also areas such as in supercomputing where the basic cost of the facility and equipment exceed what could realistically be carried as an overhead burden by the Laboratory. There is no real mechanism to systematically obtain such facilities. The end result can be an inefficient use of manpower. All of these factors tend to decrease your operating efficiency and detract from the psychic income, but do not prevent a dedicated group of scientists and engineers from conducting the work which they know must be done. This is an area where the Laboratory Demonstration Program can help by developing legislation which would allow the Demonstration Laboratories to utilize the Industrial Fund overhead accounts for major construction.

Dr. THORNTON. LABCOM Laboratories contain a broad spectrum of excellent working environment and facilities. Productivity enhancement funds provided by the Congress have made possible the purchase of a wide variety of special purpose scientific equipment at the cutting edge of the state-of-the-art.

Capabilities include the latest microfabrication and microanalytical facilities, and the Pulse Power Center at ETDL; supercomputer-based modeling and simulation facilities at the Ballistic Research Laboratory; the world's largest gamma radiation simulator at Harry Diamond Laboratories, and the airborne (Big Crow) electronics warfare laboratory at the Vulnerability Assessment Laboratory. Such modernization is an inherent requirement of an ongoing, successful R&D organization.

A relatively low priority for new R&D plant facilities under the Military Construction Authority impedes overall laboratory modernization efforts. New legislation may be required to permit rapid, efficient construction of required new R&D facilities.

Although the quality of existing facilities has not seriously prevented laboratories from performing their assigned missions in the past, new emerging technologies in the fields of nanoelectronics biotechnology, robotics, advanced propulsion, and advanced propulsion, and materials and materials processing will require new construction and ongoing upgrades if successful operation is to be continued. These considerations are particularly important as we move to position ourselves and provide funding to establish the more effective R&D organization that we envision to meet the changing needs of the future Army in the face of an immediate need for reduction in defense spending. There is a concern that productivity enhancement funding be preserved and augmented as appropriate to attract and retain competitive scientists and engineers, support both permanent and temporary users from the overall technical community, and deliver critical technology products.

Ongoing upgrades of facilities would also be greatly improved through legislation to permit the creation of an asset capitalization program that would allow the laboratory to amortize the cost equipment and accumulate capital for purchase of facilities and equipment through charges to laboratory customers.

Dr. RICHEY. One of our key concerns is the lack of flexibility modernizing our R&D facilities. The military construction is far too slow and cumbersome to be responsive to the needs of a dynamic research environment. Under the DOD Lab Demo program in which WRDC is one of two Air Force centers selected to participate, we are proposing additional flexibility to upgrade our research facilities in a timely manner. OSD will be bringing a consolidated proposal to the Congress. In WRDC, our facilities for research are generally good. Our main shortfall is local access to a supercomputer of the CRAY-2 class to work some of the complex analysis of fluids, materials, and electromagnetics. For these larger problems which outstrip the capabilities of computers at Wright-Patterson, we have to use remote computers at Kirtland AFB, NM or NASA. This slows the time to achieve research results and limits our ability to rapidly make changes in the methods or the designs.

[Whereupon at 4:25 p.m., the hearing was adjourned.]

# DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1991

WEDNESDAY, MAY 23, 1990

U.S. SENATE, SUBCOMMITTEE ON STRATEGIC FORCES AND NUCLEAR DETERRENCE AND SUBCOMMITTEE ON DEFENSE INDUSTRY AND TECHNOLOGY, COMMITTEE ON ARMED SERVICES,

*Washington, DC.*

## DEPARTMENT OF ENERGY LABORATORY MANAGEMENT

The subcommittees met, pursuant to notice, at 9:34 a.m., in room SR-222, Russell Senate Office Building, Senator J. James Exon (chairman of the Subcommittee on Strategic Forces and Nuclear Deterrence) presiding.

Committee members present: Senators Exon and Bingaman.

Committee staff members present: Madelyn R. Creedon, counsel.

Professional staff members present: William E. Hoehn, Jr., T. Kirk McConnell, and William H. Smith.

Minority staff members present: Jonathan L. Etherton and George W. Lauffer.

Staff assistant present: Melissa Ann Ramsey.

Committee members' assistants present: Andrew W. Johnson, assistant to Senator Exon; Kenneth N. Luongo, assistant to Senator Levin; Christopher E. Paine, assistant to Senator Kennedy; Edward M. McGaffigan, Jr., Patrick von Bargen, and John Gerhart, assistants to Senator Bingaman; Leon S. Fuerth, assistant to Senator Gore; Jefferson B. Seabright, assistant to Senator Wirth; Melvin G. Dubee, assistant to Senator Byrd; Patrick F. McCartan, assistant to Senator Wilson; Robert M. Soofer, assistant to Senator Gorton; and Charles G. Pearcy, assistant to Senator Lott.

### OPENING STATEMENT OF SENATOR J. JAMES EXON, CHAIRMAN, SUBCOMMITTEE ON STRATEGIC FORCES AND NUCLEAR DETERRENCE

Senator EXON. The subcommittees will please come to order. The Subcommittee on Strategic Forces and Nuclear Deterrence and the Subcommittee on Defense Industry and Technology meet today in a joint hearing to obtain testimony from two panels concerning Department of Energy contractor and laboratory management issues.

I am very pleased to have the chairman of the other subcommittee of jurisdiction. We have joint jurisdiction on some of these things, and so we got together and decided that we would have a joint hearing on this matter. And as soon as I finish my opening

statement, I will call upon my great friend and colleague, Senator Bingaman, for any opening comments that he has.

The first panel will testify on the proposed changes to the Department of Energy's regulations governing contracting practices between the Department of Energy and its profit-making and fee-bearing managing and operating contractors.

The second panel will address the issues associated with the management of the Department of Energy laboratories, and we will have some questions regarding some disclosures that were very prominent in the press this morning, some or all of which have been known to some of us for a long period of time.

We also would request any members of the panels who may be able to shed some light on this in closed session this afternoon, we would appreciate your trying to arrange your departure plans so that you might accommodate us. If you are not aware of the fact, the Secretary of Energy will be testifying this afternoon in open session. We will then go into a closed session, subsequent to that open session, here in this room, after we have secured the room for proper clearance and guidance.

But I am sure that there will be some questions of this panel today, at least in an unclassified setting, and we believe that given the news media accounts today, that some attention should be given that in this morning's hearing, although that was not the particular reason that we called you in for your presentations today.

The participants on the first panel are Dr. Donald W. Kerr, President of EG&G, Incorporated; Mr. Samuel R. Pitts, Vice President, Environmental Affairs at Westinghouse Electric Corporation; Mr. Russell J. Christesen, Chairman Emeritus of the Ebasco Services; and Dr. George Gleason, Senior Vice President and General Counsel, NUS Corporation and Chairman of the Federal Action Committee on the Hazardous Waste Action Coalition.

Christine Gregoire, the Director of the State of Washington Department of Ecology was unable to be here in person this morning, but has submitted a written statement for the record, and without objections that will be accepted at this time and placed in an appropriate place in the record.

[The information follows:]

PREPARED STATEMENT OF CHRISTINE O. GREGOIRE, DIRECTOR

STATE OF WASHINGTON, DEPARTMENT OF ECOLOGY

Greetings: Chairman Exon, Chairman Bingaman, and members of the subcommittees, I am Christine O. Gregoire, Director of the Washington State Department of Ecology. It is my pleasure to have the opportunity to offer you testimony on the Department of Energy's (DOE) management and operation (M&O) contracting policies, and on DOE's January 26, 1990, draft rulemaking amending chapter 9, title 48 CFR, Part 970.

As Director of the state Department of Ecology and in my previous position with the Washington Attorney General's Office, I have worked intensively on federal facility issues. Most recently, I and my staff, have completed long and arduous negotiation of the **Hanford Federal Facility Agreement and Consent Order** between the State, the Department of Energy, and the Environmental Protection Agency. This Agreement delineates those actions necessary to bring DOE's Hanford reservation into compliance with state and federal hazardous waste law, and to cleanup facilities and the adjacent environment. We are just now embarking on a scheduled thirty year partnership to achieve that cleanup. A partnership which we share with you, the congress, the public, and DOE's contractors.

Efforts on each of our parts over the past few years have brought us to the point where a number of critical initiatives are now aiding us in the development of an effective national program for the cleanup of federal facilities. These include:

- The implementation of Secretary Watkin's June, 1989 ten point initiatives, and DOE's subsequent five year planning process;

- The recognition of the need for broad cultural change throughout the DOE and its contractors in order to bring about increased awareness and responsiveness when dealing with environmental, safety, and health issues;

- The negotiation of federal facility cleanup agreements nationwide, in a manner which rebuilds the support of the public;

- The establishment of a stable, long term funding mechanism to achieve the cleanup of federal facilities within a thirty year period;

- Concurrent actions which focus on the efficient spending of cleanup dollars;

- Actions to ensure that federal agencies are accountable for compliance and cleanup to the same extent, and in the same manner, as the private sector, i.e., passage of the Federal Facility Compliance Act of 1989 (S 1140); and

- Similar efforts to ensure the accountability of DOE M&O contractors by establishing the proper incentives to perform efficiently.

**Each of these initiatives represents an essential element in the development of a successful and cost effective national program.**

We are consequently encouraged by the Department of Energy's recognition of the need to strengthen contractor accountability, and the recognition that "DOE's reimbursement practices may not have provided the appropriate incentive to M&O contractors to minimize their costs while simultaneously safeguarding the public health, safety, and the environment since the government has, in effect, agreed to indemnify them against all costs incurred."

Simply put, we can no longer afford contractual policies which shield DOE contractors from accountability for actions under their control. Doing so would place our actions to develop a successful national cleanup program in jeopardy by maintaining inefficient systems of the past in the face of cleanup projects and costs of unprecedented magnitude. Our efforts should instead recognize clear accountability as one of the

principle means to achieve effective management and efficient cost control.

DOE's Hanford site stands as a prime example of the need for this accountability. At Hanford, we face one of the world's largest accumulations of radioactive and chemically hazardous waste, failing storage facilities which have already resulted in large scale releases to the environment, and waste management practices which are far behind those demanded of the private sector. Addressing these problems adequately will entail some thirty years of interrelated, technically complex tasks, with costs running well into the tens of billions. Some 14,000 contractor staff currently have direct responsibility for achieving compliant waste management practices, operating associated facilities safely, and beginning the remediation process. These staff are "overseen" by some 340 DOE personnel. Without strict lines of accountability at this and other DOE sites, I fear that we are setting ourselves up for decades of inefficiency and cost overruns.

Consequently, we support a DOE rulemaking under 48 CFR Part 970 which:

1. Does not allow indemnification and reimbursement for damages due to negligence where, in effect, the M&O contractor has not provided DOE the skill for which it bargained; and

2. Does not allow reimbursement of fines, penalties, settlements, and litigation expenses resulting from violations of, or the failure of the contractor to comply with, federal, state, local, or foreign laws and regulations.

We also support DOE's proposed rulemaking inasmuch as it would disallow reimbursement for bonds or insurance to the extent that they are incurred to protect and indemnify the contractor against otherwise unallowable costs (fines and penalties, third party claims, negligently or willfully caused additional programmatic expenses, and damages to government property).

**However**, our support of these measures is tempered by concern that, as drafted, DOE's

rulemaking would inadvertently also establish a number of provisions which run directly contrary to its intent. These concerns center on the following:

1. Rules delineating increased accountability would only apply to profit making M&O contractors. Indemnification policies for nonprofit contractors would continue.

This provision offers no rationale for this dual policy, and would apparently apply regardless of any nonprofit contractor's responsibilities for environmental, safety, or health related actions. There should be no blanket indemnity for truly nonprofit contractors. They should be held accountable for their actions (or inaction), although the extent or degree of penalty or fines may differ from those applied to profit-making organization.

2. DOE's proposed rulemaking would allow indemnification and reimbursement to the contractor, following submittal of a simple notification identifying an instance of noncompliance to the contracting officer.

No actions or evidence of appropriate actions by the contractor are required.

3. DOE's draft rule notes that fines, penalties, etc., are not allowable costs "unless such fines and penalties result from acts or omissions which were specifically directed or authorized by the contracting officer, or occur after specific instances of noncompliance were reported by the contractor to the contracting officer and necessary authorizations or appropriations to correct the conditions were not received."

This provision is particularly troubling in that without a clear waiver of sovereign immunity under the Resource Conservation and Recovery Act, and without a requirement that DOE, as an agency, request necessary funds for timely cleanup from the Congress, contractors would be shielded, and inaction by DOE maintained under an assertion of insufficient funds. Proposed language should be revised by modification to read ...**unless such fines and penalties result from acts or omissions which were specifically directed**

**or authorized by the contracting officer.**

SUMMARY

Strengthening DOE's M&O contracting policies is but one of a number of essential elements necessary for the establishment of an efficient and cost effective national program for achieving compliance and cleanup at federal facilities.

Washington State applauds and encourages DOE's initiatives to ensure contractor accountability by ceasing its longstanding practice of indemnifying contractors from accountability for actions taken (or not taken) in the areas of environment, safety, and health. We support DOE's rulemaking in large, but also feel that there are a number of key provisions needing strengthening.

It is also important that DOE's proposed M&O rulemaking be considered with recognition of other related actions which are equally essential to the establishment of a strong national federal facility cleanup program; including clear accountability of DOE itself through the passage of legislation such as S 1140, and requests by the Secretary of Energy for funds necessary for compliance and timely cleanup from the Congress.

Thank you for the opportunity to offer testimony on this important issue. I would be happy to provide responses to any questions or concerns you may have.

Senator EXON. Participants in our second panel are Dr. Albert Narath, President of Sandia National Laboratories; Dr. John Nuckolls, Director of Lawrence Livermore Laboratory; and Dr. Siegfried S. Hecker, Director of the Los Alamos National Laboratory. We welcome each and every one of the members of the panels to the hearing this morning and look forward to your testimony on these issues of concern to the committee.

I will chair the initial portion of this hearing until approximately 10:15 and I would indicate to all Senators now that there is a rollcall vote scheduled at about 10:15 on the DeConcini amendment. And, Jeff, that might be a good time for us to break into the second part of the panel. I have to leave for previously scheduled appointments, and I will turn the chair over to my distinguished colleague and chairman of the Defense Industry and Technology Subcommittee, Senator Bingaman.

The management and operating contractors are key players in the Department of Energy's ability to operate the defense produc-

tion complex. Recently, however, the Department of Energy has been criticized for the special relationship that has existed between the Department and its managing and operating contractors. In January of this year the Department of Energy published a notice of proposed rule-making that would change significantly this special relationship. The Department proposed the changes to provide improved accountability of managing and operating contractors, and it placed increased emphasis on the contractor's responsibility and obligations, particularly in the areas of environmental protection and compliance and public and worker health and safety.

The Department of Energy received a large volume of comments on its proposal and has only just begun the review process. Because of the long-term impact changes of this magnitude will have, the subcommittees are very interested in the comments of those most affected: the public and the contractors.

The statements of the witnesses here this morning, in their entirety, as well as others who have submitted statements, will be made a part of the record at an appropriate place. Without objection, that is so ordered.

Let me now turn to Senator Bingaman, chairman of the Subcommittee on Defense Industry and Technology, for his opening remarks. Senator Bingaman.

## STATEMENT OF SENATOR JEFF BINGAMAN, CHAIRMAN, SUBCOMMITTEE ON DEFENSE INDUSTRY AND TECHNOLOGY

Senator BINGAMAN. Thank you very much, Mr. Chairman. I do appreciate your permitting the two subcommittees to go ahead and have a joint session on this set of issues. I think we have very important issues to discuss and hear testimony on this morning.

On the issue of the Department of Energy's relationship with its contractors, I know the first panel has some very important things to say about that set of issues, and the second panel of course is made up of the laboratory directors. I think we have a proud record of accomplishment in the laboratories over the last 45 years in developing technology that we have needed for our country's security and for other purposes, and I think we have done some things in the last year or so to ensure that those laboratories also can make the appropriate contribution and the needed contribution in non-defense areas.

I do believe that we will hear some about that today from the witnesses. I look forward to hearing from them, and as you indicated, in regard to the safety issues that are referred to in the news today, I think we can get into those this afternoon with Secretary Watkins and perhaps in a general way at least with some of the laboratory directors as well.

But I appreciate your doing this. I think we are going to have very good testimony, and I am glad to participate.

[The prepared statement of Senator Bingaman follows:]

### PREPARED STATEMENT BY SENATOR JEFF BINGAMAN

Thank you Senator Exon for holding this joint hearing of our two subcommittees on the Department of Energy's relations with its contractors and on the programs and management of the Department of Energy weapons laboratories.

The Department of Energy's national laboratories, two of the three in my home State of New Mexico, have achieved an outstanding record over the past 45 years in providing the technology needed to support our Nation's nuclear deterrence. Their work in this arena is not done, as today's front page article in the Washington Post attests. We will go into the back-log of upgrade requirements for our nuclear weapons stockpile in closed session later today. But our focus in open session will be on those steps necessary to ensure that the outstanding scientific and engineering capabilities of these laboratories are available to be used in other ways to the Nation's best advantage.

The Department of Energy weapons laboratories face a significant challenge and a great opportunity in the years ahead as they seek to apply their enormous talents to addressing growing national needs in such research areas such as arms control verification, environmental restoration, conventional weapons, supercomputing, space applications, genetics, and drug interdiction, and in science and math education of our children. Key to an enhanced role for the labs in these areas will be their ability to transfer technology promptly and effectively to the private sector.

The fiscal year 1990 Defense Authorization Act included legislation that, for the first time, permits the national labs to become key players in supporting the Nation's economic competitiveness in addition to its national security. The act gives the laboratories the statutory authority to negotiate cooperative research and development agreements with the private sector and establishes technology transfer as a mission for the Department of Energy.

In the short period since this legislation was passed I have seen the laboratories embrace their new mission enthusiastically and initiate a number of new innovative arrangements for working with the private sector. I understand that the Department of Energy is now considering more than 40 different proposals for transfer of technology developed at the laboratories in areas such as precision machining, advanced ceramics, specialty metal processing, and robotics.

I commend the labs on their efforts to date to respond to last year's legislation and look forward to the testimony of the three distinguished laboratory leaders, Dr. Narath, Dr. Nuckolls, and Dr. Hecker, in presenting their assessment of the current health of their laboratories, the laboratories' evolving role in these times of dramatic change around the globe, and how they are approaching their diversification and new technology enhancement mission.

Senator EXON. Senator Bingaman, thank you very much. Senator Thurmond has requested that his prepared statement be made a part of today's record.

[The prepared statement of Senator Thurmond follows:]

PREPARED STATEMENT BY SENATOR STROM THURMOND

Mr. Chairman, I have just a short statement, because we want to hear from these distinguished witnesses. The witnesses before us are here because of an exceedingly wise decision made by our predecessors in this body years ago; that the operation of the nuclear weapon laboratories and plants was not to be entrusted to the military, or to government employees, but to the best our country could find, in industry and university. Because of that decision, we have had the benefit of the best managed companies, with the best technology and best people, and the best universities, working in cooperation and trust with the Government. This approach is what made the nuclear weapons program, which has given us successful deterrence of war for 45 years.

Mr. Chairman, although the operation of our nuclear weapons laboratories and plants has worked well up to now, there is a cloud on the horizon which I feel must be addressed. There is great pressure now to rupture the unique working relationship between industry and government that has worked for all these years, and to put in its place a relationship of accusation, acrimony, and antagonism. I have been careful up to now not to appear to interfere with the process of the Department of Energy rule-making on contractor liability, and do not wish to do so now. I must note with alarm, however, that certain elements in the other body have been working intensely to persuade Department of Energy to make the regulations yet more Draconian.

Mr. Chairman, that approach can only destroy the defense nuclear program. Whatever form the eventual rule-making will take, I can only hope that wisdom will prevail, and that the legitimate concerns of the contractor managers and operators will be taken into account. It is those concerns we hope to hear from these panels.

Thank you, Mr. Chairman.

Senator EXON. Dr. Kerr, I understand that you and Mr. Christesen and Mr. Gleason have brief opening remarks, and then we will proceed to questioning. Dr. Kerr, please proceed at this time.

## STATEMENT OF DONALD W. KERR, PRESIDENT, EG&G, INCORPORATED

Dr. Kerr: Thank you, Mr. Chairman, members of the committee, I am pleased to be here to discuss this very important issue with you, and thank you for including our rather long statement in the record.

I will take this opportunity to offer just a few highlights so that we can get to your questions quickly. EG&G performs on five large management and operating contracts. Two for weapons production facilities at Rocky Flats and the Mound Plant in Miamisburg, Ohio. Two at the Nevada Test Site, one for weapons test instrumentation and support to the NEST program, and the other as the prime contractor for site operations. And last, we are one of the large contractors at the Idaho National Engineering Laboratory, a responsibility that we share with Westinghouse.

We have considerable concern about the proposed rule, and what I will do is try to highlight the seven points we think are most important so that you understand the depth and breadth of our concern.

The first has to do with the question of whether public companies owned by shareholders, such as ours is, will find it attractive to continue in the M&O relationship with the Department of Energy if rules like the one proposed are, in fact, ultimately brought into force.

To give you an example of how feelings are changing at this time, we have in the past 2 years had various shareholder initiatives at our annual meeting. This year the initiative went directly to the point of discussion here, when a group asked that we establish a special committee to evaluate our company's Department of Energy nuclear weapons operations and report to all shareholders within 1 year an assessment of the present contracts in light of renewed questions about liability. It is clear that the management responsibility for the capital these people have invested is a significant one, of increasing concern to them and consequently something we have to look to in the future in order to satisfy our shareholders that we have not taken on undue risk under these contracts.

A second point that is important to us is the way in which this proposed rule will significantly change the relationship between the Department of Energy and its contractors. That relationship has grown up over some 45 years at this point and is a partnership that has, in fact, been very significant in the success of complex operations like weapons testing.

Time, effort, and money were used very efficiently by the parties working together harmoniously, not only based on the contract but on long working relations. The proposed rule will dramatically alter that relationship, and we believe will only result in harsh and continuing disputes over allowability of costs.

There also will develop adversarial relations, attitudes of mistrust, and haranguing with the Department of Energy over the actions of other test site contractors and the actions of nonprofit participants in the test program.

We believe that the Department of Energy should not drastically alter the rules to the detriment of everyone but itself and expect that these delicately constructed, harmonious relationships will be preserved through the change.

We believe the adoption of the proposed rule will encourage disputes among Department of Energy contractors, resulting in declining productivity, delays, and reduction in quality. Many of the locations and facilities where we operate are, in fact, locations where more than one contractor is present.

The relationships between contractors are at least as important as the relationship between the contractors and the Department of Energy. We believe that this rule will, in fact, change the relationships between contractors simply because their actions will affect each other.

The profits the contractors may make may depend on the actions of still a third party, and we believe the rule does not take appropriate account of those relationships.

To give you an example in our own case, at Mound and Rocky Flats, we produce components from parts, drawings, and specifications received from other Department of Energy contractors, and then deliver our output to still further Department of Energy contractors. And consequently tracing responsibility through that complex chain of design specifications, choices of materials, choices of processes to the finished weapon is very difficult and one that the rule I do not believe addresses in any clear way.

The fourth point I would make is that I think the adoption of the proposed rule will add costs unnecessarily to the Government. One reason is that where the Department would seek to penalize a contractor by lowering award fees, it is now going to have to develop and document a case for that. It will have to establish negligence, refute the defenses to negligence, and assess damage, all under laws and legal precedents that vary from State to State. It means a lot of people are going to be tied up both for the contractor and for the Government simply to make the record in order to deal with the new award fee procedure.

A fifth point is that the contractors in our view should not become the insurers of performance of the Department of Energy work statements. Perhaps the worst part is that henceforth disallowed costs will include direct costs and expenses resulting from ordinary negligence by the contractor or its subcontractors in carrying out well understood, non-experimental work under the contract, when the work is clearly within the sole and exclusive control of the contractors.

One of the problems we face here is that even the non-experimental work at many of these locations is unique. These are one-of-a-kind facilities. The United States, for example, has no other weapons test site. It has no other facility like Rocky Flats for producing plutonium components, and while superficially normal industrial practices may be carried out at these sites, they are, in fact, one-of-a-kind because the processes exist in no other place in

this country. Consequently, once again you are faced with a very difficult problem of establishing who designed it, who specified the process, why are you doing it the way you are doing it, and it is not necessarily at all within the contractor's sole control in any case.

The two changes concerning liability for damage to government property which in our belief are not justified are that the standard of care imposed upon the M&O contractor is going to be raised from willful misconduct and lack of good faith to ordinary negligence, and that the class of persons for whose actions the contractor shall be held liable will be expanded from the contractor's managerial personnel to anyone, even the contractor's lowest paid employee, its subcontractors, and even possibly trespassers or demonstrators. That significantly expands both the scope of negligence and the number of people within that scope from what it is today.

The sixth point that I would make is that the cost of insurance against the increased risks imposed by the proposed rule should be allowable costs. As presently proposed, the rule would generally hold that insurance costs for protecting against the new risks will be unallowable. This is contrary to other cost-type government procurement regulations. If the rule is adopted, contractors will have to purchase insurance where available since they cannot risk their company's assets without insurance. The shareholders would not allow that.

Last, there is no basis for comparison between a contractor's performance on these contracts and on its commercial activities. The drafters of the proposed rule compare the degree of management skills necessary to perform a contractor's commercial activities with its management and operating activities for the Department of Energy, and suggest that all they are looking for is that the contractor exercise the same level of expertise, skills, and prudence on its M&O contracts as it exercises in its commercial endeavors. Completely ignored by that rationale is the fact that in operating contracts, unlike commercial activities, the contractor does not control the product, the process, the materials, and above all, the price. To attempt to make that comparison is totally impractical and unrealistic.

In conclusion, EG&G believes the proposed rule should not be adopted because if enacted it would be harmful to the Department of Energy, to the contractors, and to the team attitude that has been so beneficial to this country for over 40 years. Thank you, Mr. Chairman. I will be pleased to answer any questions.

[The prepared statement of Dr. Kerr follows:]

Statement of
Donald M. Kerr
President, EG&G, Inc.

Mr. Chairman and members of the committee, I am pleased to appear before you to discuss the Notice of Proposed Rule Making, recently published by the Department of Energy (DOE) on DOE's fee bearing and profit making management and operating (M&O) contracts.

At EG&G we now perform on five such M&O contracts. These are: (1) The Rocky Flats Plant in Golden, Colorado where, in response to a request from the DOE in September 1989 EG&G agreed to take responsibility as prime contractor for the nuclear weapons manufacturing operation, waste management and environmental restoration; (ii) The Mound Plant in Miamisburg, Ohio which manufactures electroexplosive devices and other nuclear weapon components; (iii) Energy Measurements based in Las Vegas, Nevada near the DOE's Nevada Test Site where EG&G develops and operates electronic and optical instruments to diagnose weapon performance and provides major support to the Nuclear Emergency Search Team (NEST) program; (iv) Reynolds Electrical and Engineering Company (REECO) also based at Las Vegas, Nevada is prime contractor at the DOE's Nevada Test Site providing management and operational efforts, laboratory support, project construction and technical services; and (v) the Idaho National Engineering Laboratory at Idaho Falls, Idaho, where EG&G supports DOE in waste management, nuclear technology and defense matters.

We at EG&G agree with DOE on the importance of M&O contractors performing their duties in an excellent manner in all aspects including environment, health and safety and we believe our high level of performance over the past forty-three years of service to DOE reflects our total commitment to such excellence.

In my opinion EG&G and the other M&O contractors as a group have effectively and efficiently served DOE and its predecessor agencies over many years. Now, simply because DOE has been the subject of some interest regarding its contracting policies, I do not believe that it should make severe and untested changes in a proven and successful contracting system.

M&O contractors have been operating on cost-type contracts from Manhattan District days. As members of this committee are aware, the essence of DOE M&O cost-type contracting is that the contractor recover all its allowable costs and a modest fee. The overriding consideration of the allowability of costs is that the contractor utilize reasonable and prudent business judgment in expending funds for contract purposes. There is generally no provision made for reimbursement of the contractor's home office general and administrative expenses. In these circumstances the government and cost-type contractors recognize that perfection is a goal to be strived for but rarely, if ever, achieved. Mistakes will be made simply because it is the nature of the human experience on such large, somewhat non-specific work undertakings. Cost-type contracts do not disallow costs because mistakes took place or accidents occurred unless those mistakes or accidents result from the intentional actions of a very limited management group. The proposed rules however, refuse to allow for mistakes, accidents or negligence. They seek to redefine cost-type contracting and create a new type of contract, previously unknown in the world of government contracting. The proposed rule proposes such extensive changes that the Federal Acquisition Regulations (FAR) would need to be amended before these rules could be adopted.

On behalf of EG&G, I recommend that the newly proposed rules <u>not</u> be adopted for the following reasons.

Adoption of the proposed rule will reduce the number of reputable and competent companies that will be able to work on M&O contracts for DOE.

Adoption of the proposed rule will encourage disputes among DOE contractors resulting in declining productivity, delays and reduction in quality.

Adoption of the proposed rule will destroy the partnership Of DOE and its contractors.

Adoption of the proposed rule Will add costs unnecessarily to DOE.

The proposed rule is in conflict with government laws and regulations on small business, minority and disadvantaged subcontractors.

Adoption Of The Proposed Rules Will Reduce The Number Of Reputable And Competent Companies That Will Be Able To Work On M&O Contracts For DOE.

Today, stockholders in public corporations are taking increased interest in the business activities, and the resulting social effects, of the corporations in which they have made investments. In that regard, a group of EG&G stockholders filed a stockholder proposal to be voted upon at EG&G's Annual Meeting this past April. It was a proposal to:

" ..establish a special committee to evaluate our Company's DOE nuclear weapons operations and report to all shareholders within one year an assessment of the present contracts in light of renewed questions about liability."

Fortunately, this proposal was not passed. However, it demonstrates heightened stockholder concern for EG&G's liability in performing DOE contracts. Other corporations may be facing the same or similar proposals from their stockholders. If the proposed rule was adopted, the increased risks forced upon M&O contractors will undoubtedly generate a greater number of proposals which I believe would further restrict such corporations from accepting and performing M&O contracts for DOE. This would result in fewer and lower reputable and competent corporations available to do this important work. Even the promise of increased award fee pools does not offset the potential for such stockholder actions. With the adoption of the proposed rules; such stockholder actions would gain increasing support and in my opinion DOE would be the loser, since its ability to engage the solid, well-recognized and financially responsible companies that have performed exceedingly well for it over the past decades would be impaired.

Even before stockholders act to prevent their corporations from accepting the liability of performing M&O contracts, we the management of those contractors, will have to take a hard look at any new "avoided cost" rules imposed upon us by DOE, to determine if we can continue contracting with DOE without violating our fiduciary duties to our stockholders. The scope of the additional risk forced upon contractors must be weighed against possible rewards to determine if there is sufficient justification for taking such risks.

Adoption Of The proposed rule Will Encourage Disputes Among DOE Contractors Resulting In Declining Productivity, Delays and Reduction in Quality.

For example, it is my belief that the success of the weapons test program has resulted to a large extent from a spirit of cooperation and trust among many DOE contractors, both profit and non-profit. I think it is well demonstrated that this cooperation and trust has provided DOE and the country with the safest, sanest and most productive weapons program in history. In my view, the proposed rulemaking will effectively demolish this relationship among contractors. In the rule as proposed, liability for damage to Government property as well as other liability issues are matters to be resolved among the parties involved. Since we are talking about matters which will affect the profit of contractors, it is easy to imagine the rancorous fingerpointing that will result when liability is to attach under a multi-contractor operation. By the way, multi-contractor operations in the weapons program are more the rule than the exception. For example, as I mentioned above, two of our EG&G companies, EG&G EMI and REECO are among the many M&O contractors working at the Nevada Test Site (NTS). EG&G Idaho operates the Idaho National Engineering Laboratory (INEL) with other contractors. EG&G Mound and EG&G Rocky Flats produce components from parts, drawings and specifications received from other M&O contractors and they deliver their output to still other DOE contractors. In all cases, our EG&G companies work with other profit and non-profit DOE contractors and the national program has benefited from this cooperative relationship which to date has been free from the structuring and posturing that could result from the need to protect one's flank when one's profit level is in jeopardy. I question if that cooperative attitude will prevail if the proposed rule is adopted.

It is clear that the proposed rule encourages contractors to place their own-self interests and protection ahead of the best interests of a program. This is the antithesis of trust and cooperation. It will break down the trust and spirit that was the hallmark of DOE M&O contractors.

In the case of non-profit M&O contractors, there is no guidance in the proposed rules as to the result when there is a liability dispute between a profit and a non-profit (<u>which non-profit is exempted from the proposed rules</u>). If some share of the liability falls to the non-profit, how do we obtain indemnification from an exempt party?

At least one of our EG&G companies receives contract technical direction from a non-profit M&O contractor who also grades it for performance under the award fee determination plan. It is a potentially impossible situation when we are in dispute, in which we are seeking compensation, with a customer that also will grade us for award fee purposes.

<u>Adoption Of The Proposed Rule Will Destroy The Partnership of DOE And it's Contractors.</u>

It is well known that there has been a team-approach type of partnership between DOE (and predecessors) and its M&O contractors. Problems were identified and solved together. We worked together to reach specific goals. We were not in an adversarial position. This saved time, effort and money and contributed greatly to the success of the programs and helped build a strong national defense. It is my belief that the proposed rule will produce many harsh and continuing disputes over the unallowability of costs. There can only develop from such continued disputatiousness, an adversarial relationship with an attendant attitude of mistrust on the part of the disputing parties. Also, the proposed rules may create an atmosphere highlighted by constant haranguing over the condition of property, the uncooperativeness of other contractors and changed relationships with non-profit contractors. The proposed rule could

destroy the harmony that we, and other M&O contractors have carefully nourished and built-up over forty years. DOE cannot drastically change the rules to our detriment and then expect the delicately-constructed harmony to continue unaffected.

It is absolutely clear to me that the detriment to DOE from the proposed rule far outweighs any benefit DOE may expect from it.

Adoption Of The Proposed Rule Will Add Costs Unnecessarily To DOE.

If the proposed rule is adopted, DOE's cost of accomplishing its mission will greatly increase because:

DOE will need a larger staff both in headquarters and in the field to implement the proposed rule.

Contractors will need a larger staff to exercise greater planning, study and review for each phase of the work.

Contractors will be less productive.

Subcontracting will be more costly.

Paying all costs of doing business will increase costs.

Costs for environmental, health and safety will increase.

The proposed rule shifts certain costs from DOE to the M&O contractors (avoided costs) presumably in an effort to reduce program cost. If the proposed rule is finally adopted, I believe that the contrary will turn out to be true and the result will be greater, not lesser, cost to DOE.

DOE will need a larger staff at both headquarters and in the field to monitor and audit M&O contractors to determine which of the newly defined avoided costs are our responsibility. In each and every instance where DOE seeks to penalize us by lowering our award fee it will have to develop a case against us and document the evidence. It will be necessary for it to establish negligence, refute defenses to negligence and assess damages, all under laws and legal precedents that vary from state to state. The number of disputes that will arise between DOE and M&O contractors which will require a contracting officer's final decision are going to multiply manyfold. The DOE board of Contract Appeals and the Federal courts will be inundated with appeals. These costly activities will waste funds and even worse, the time of our key people that could otherwise have been better used to accomplish DOE's mission.

We, as contractors, will have to add personnel, at DOE's expense, to more carefully plan our work and to insure not only that it is done with a minimum chance of chargeable error but also that DOE concurrence is sought on every drawing, procedure and action. It will, necessarily be our goal to get DOE to approve, accept or concur in all our tasks, plans and actions to minimize our liability exposure. This too, will cause funds to be spent for the wrong purpose and can you imagine how it will affect schedules?.

I believe most fervently that the adoption of the proposed rule will render contractors less productive because we will be less efficient. If we are responsible for slip and fall accidents, we will not make deliveries when there is snow on the ground!!! Excess caution may be used to the detriment of project goals. This is not to say that recklessness is practiced today or that it ought to be practiced anytime. It is simply a fact of life that if our workers are worried about personal responsibility they will be overly

cautious to the point of being less productive.

In many places the proposed rule penalizes us for the acts of our subcontractors and suggests in such cases we seek compensation from them. Finding reputable and competent subcontractors who are willing and financially able to accept such responsibility as set forth in the proposed rule, would indeed be difficult and in some cases maybe impossible. If they could be found, extensive time and effort would be spent on the search and the negotiations of their potential liability to us when we are penalized by the DOE for their acts. This would increase DOE's cost without any concurrent benefit.

To further complicate this very negative matter, the proposed rule declares for the most part that insurance costs for such matters will be unallowable to us. This is contrary to all other cost-type government procurement regulations. If the proposed rule is finally adopted, we will have to purchase insurance where it is available whether the Government likes it or not. We cannot risk our company's assets in this manner. Also, there is no Insurance for environmental damages or for fines or penalties. Insurance for injury to persons and damage to property can be obtained but at a significant cost which we as contractors with very low fees cannot reasonably be expected to absorb. When those costs are totaled for each and every DOE M&O contractor they will be enormous and far outweigh any alleged benefits resulting from the proposed rule.

The costs of insurance should be an allowable cost on M&O contracts just as they are on DOE's other cost-type contracts and on similar DOD contracts. If the proposed rules are not changed to make insurance costs allowable, base fees will have to be greatly increased to cover this additional cost. We will not and cannot stay in business and lose money. Regardless of how it is paid for, insurance will sharply escalate DOE's costs without contributing to accomplishment of the tasks at hand.

Over the years, DOE has literally saved millions of taxpayer's dollars with its present policy of being a self insurer of contractor risks. Judging from my experience, I believe that the actual costs incurred by DOE acting in such a manner have been quite small in themselves and absolutely negligible when compared to insurance premiums for insurance that was not purchased by contractors because they had adequate DOE protection.

Whether or not the proposed rule is adopted, costs to correct environmental health and safety problems will increase. If the proposed rule is adopted, these environmental costs will increase because it will be very difficult if not impossible to find a contractor or subcontractor to do this work when that contractor may be held liable for any mistakes that makes or any violations that occur from whatever source. If the proposed rule is not adopted, costs will still increase for environmental, health and safety but not at the same rate because some of the burdensome requirements will not be present.

In summary, adoption of proposed rule will cost DOE more funds for which it will receive little or nothing in return. I suggest that DOE conduct a cost impact study on the proposed rule to determine the financial effect of adopting it. If it did so, I believe the results would be astonishing.

<u>The Proposed Rule Is In Conflict With Government Laws And Regulations On Small Business, Minority And Disadvantaged Subcontractors.</u>

Federal statutes and procurement regulations require government agencies and their contractors to award a predetermined amount of purchase orders and subcontracts to small businesses, minority and

disadvantaged concerns and to others submitting low, responsive bids, while at the same time the proposed rule would make M&O contractors liable for the negligence and actions of their subcontractors. To protect ourselves in subcontract situations we will require indemnification from subcontractors and evidence of financial strength to provide such indemnity. The DOE can hardly object to our imposing this on our subcontractors when we are merely passing on a burden imposed on us by DOE. Small business, minority and disadvantaged concerns are usually the least able to provide assurance such as we will require. I wonder then, if it doesn't follow that they would, therefore, be precluded from such work. Certain continuing subcontracts in effect at the time the new rules were incorporated into an M&O contract, would need to be renegotiated to add the new indemnity provisions before work could continue or the M&O contractor would be exposed to unallowable costs arising out of. negligent or defective subcontractor services or materials. I do not believe we have the right to unilaterally impose such a provision on our suppliers and I wonder where that inability would leave us as prime contractors.

Therefore, I'm convinced that adoption of the proposed rule would cause conflict with existing laws and regulations, and frustrate the goal of encouraging small, minority and disadvantaged businesses.

In summary, it is my recommendation that the proposed rule <u>not</u> be adopted because the proposed rules will severely hurt DOE and impede us as M&O contractors in our joint efforts to accomplish our basic missions.

In the event that my recommendation that the proposed rule not be adopted is not accepted, I believe important changes need to be made. The proposed rule is flawed by excessive imposition of liability upon us as M&O contractors. The proposed rule should be changed to:

Eliminate contractor liability for ordinary negligence.

Eliminate contractor liability for damage to government property except as currently provided in the regulations.

Eliminate contractor liability for actions, negligence and omissions of others except as currently provided in the regulations.

Define clearly what is meant by certain terms in the proposed rule.

Add a provision that contractors are not liable for any costs, damages or litigation arising out of prior existing events and conditions.

Set a time limitation on claims.

Clarify the matter of cost and control of litigation.

<u>Eliminate Liability for Ordinary Negligence</u>

The proposed rule creates an enormous change in the standard of care to be imposed when determining contractor liability from that of <u>"willful misconduct and lack of good faith"</u> on the part of a General Manager and perhaps a few key management people reporting to him, to ordinary negligence of every one of our employees, our subcontractors' employees and certain other non-employees, maybe even in some cases trespassers or demonstrators. Even if the proposed changes were limited to ordinary negligence of the General

Manager and the same key employees, it would represent a giant shift of liability, but to change the standard and then extend it to every employee, where we and other contractors have thousands of employees, strains my credulity. This change of contractor liability will embroil DOE, us as M&O contractors and the multiplicity of our subcontractors and third parties in an administrative quagmire. The arguments, disputes and appeals with the resultant loss of productivity, quality and time will greatly impact the work to be accomplished. Government cost-type contractors are not expected to assume this liability on contracts with other agencies. Adoption of the proposed rule would impose on M&O contractors the same liability placed on fixed-price contractors without the corresponding benefits of home office general and administrative expense reimbursement, profit levels three to four times higher and freedom to perform the work without extensive government oversight.

The concept of making an M&O contractor responsible for the negligent acts of all of its employees overlooks certain factors. We, as M&O contractors do not have the same control over our employees as in our commercial businesses. We do not have the same flexibility in hiring and dismissing employees as we have in the commercial world. DOE places limitations upon who may be hired and controls hiring plans, training programs, salaries, and employee motivational and morale programs. In some cases, DOE has required us as contractors to continue to employ all or substantially all the workforce of a predecessor contractor. With such DOE control it is inappropriate to place greater responsibility upon us for the actions of our employees than would be placed upon other DOE or other cost-type contractors who are not subject to the same DOE controls. In fact, the proposed rule, if adopted, would make the contractor an <u>absolute insurer</u> of all actions of its employees at whatever level, In addition, M&O contractors work with union membership under collective bargaining agreements. The liability that the proposed rules impose on the contractor was not contemplated when these collective bargaining agreements were negotiated.

Further, it's clear to me that the proposed rules are not sensitive to the fact that the government in many instances is engaged in hazardous activities, handling dangerous materials and attending to the clean-up of environmental condition all of which require extraordinary care. Consequently, ordinarily minor carelessness could result in major repair or restoration costs. The government has provided contractors with expensive, specialized equipment which, if even slightly damaged through operator negligence, could result in large repair costs. The potential for catastrophic damages is so great that it is impractical for M&O contractors to assume such liability and I don't believe we should be asked to do so.

<u>Eliminate Liability For Damage To Government Property.</u>

The proposed rule makes M&O contractors responsible for damages to government property under the contractor's control so long as someone was negligent and so long as such damage results without any fault of DOE.

To require us to be responsible for damage to government property whatever the source of that damage, far exceeds the standard for liability specified in the Federal and DOE acquisition regulations. These regulations do not indemnify the government against damage to or loss of government property by cost-type contractors except where such lose or damage results from the "willful misconduct or lack of good faith" on the part of the contractor's managerial personnel. Managerial personnel includes officers, directors and managers of an entire contractor operation.

This expansion of liability by the proposed rule is excessive and outside the scope of other cost-type contracts. The M&O contractor

should be limited to the liability as currently set forth in existing federal procurement regulations.

Eliminate Liability For Actions, Negligence and Omission Of Others.

In my view one of the most egregious aspects of the proposed rule is that calling for the assignment of responsibility to M&O contractors for the liability of others. These others include subcontractors (at all levels), other prime contractors to DOE (either profit or non-profit), prime contractors to other government departments and agencies and third parties (whether they be business invitees, visitors, protesters or trespassers). This is truly an unbelievable burden for a prime contractor. In most cases, we do not have sufficient control over our subcontractors to insure they do not render us liable. We have pointed out above the difficulty and added cost of obtaining indemnification from subcontractors. There is no way for us to protect against damages caused by visitors, protesters or trespassers.

The problem is even greater at multi-contractor sites such as NTS where there are many other entities present. That it might be suggested that we as an M&O contractor should be responsible for damage partially caused by another contractor, a visitor, a DOE-invited guest, an anti-nuclear protester or even an illegal trespasser is surprising to me.

For all these reasons, I suggest in the strongest terms that M&O contractors should not be made liable for the accidents, negligence, fines and penalties of others.

Define Specific Terms.

One of the major concerns created by the suggested changes is the manner of assessing damages. A guiding principle in the relationship between DOE and its M&O contractors in the past has been teamwork and the avoidance of polarization and adversarial relationships. The problems associated with disagreements as to liability and assessment of damages will significantly undermine this relationship. Since these are novel concepts in government cost-type contracting, there will be no established guidelines for making such determinations.

We are not told; and do not know, how liability will be determined or what level of DOE control and direction will exempt us. The application of the laws, defenses and precedents governing negligence are different from one jurisdiction to another. There is no standard of which we are aware that can be used nationwide.

The measure of damages is another wide-open question. There are different ways of measuring damages including replacement value, depreciated value and repair value. Which measure will be imposed under which circumstances is not defined. Further definition is needed. Rework is another area that is without definition and requires clarification. These and other issues are not defined in the suggested rule and will only serve to create an adversarial and disputatious atmosphere between DOE and M&O contractors.

For example, at the NTS we interact with multiple prime contractors, hundreds of subcontractors, several laboratories and many different agencies. Even now it is often difficult to determine when the control or responsibility of one entity ends and another

begins. However; under the present rules, everyone is focused sharply on the mission since liability is not a prime issue. In sharp contrast, under the proposed rule, an adversarial posture will be created with the primary focus on avoiding exposure to liability.

What is "non-experimental work" as applied to the ordinary negligence provisions of the proposed rule? I believe that most if not all the work EG&G does on some contracts is experimental. The work performed is unique in design, study, fabrication and testing of special materials and procedures under a heavy security cover which is unlike any performed in the commercial business work. Also, the maximum penalty assessment against contractors should be clearly defined. There has already been some confusion over it. EG&G understands that the maximum penalty that may be assessed against a contractor is the maximum award fee that was available to it during the six-month evaluation period and that the base fee is not included in the maximum available award fee. I have heard other versions of this explanation and I am not sure which is correct. Perhaps this matter will be clarified in the fee proposed rule to be issued today. Notwithstanding which version is correct it appears that the proposed rule would penalize a contractor up to an amount that represents a fee he could have earned and not what he did earn. Since M&O contractors are rarely awarded the maximum amount available, we could end up paying out more than we earned. This possibility has always existed in fixed-price procurements, but I believe its a first for cost-reimbursement contractors.

Add A Cut-Off of Liability.

If the proposed rule implemented there should be a clear cut-off point prior to which we contractors would have no liability. After the passage of the new rules and the execution of a contract amendment with a contractor, the new rules must apply prospectively from the effective date of such amendment. This is basic contract law. Up until that point the contractor is operating under the contractual protection of the current indemnification provided by DOE to cover these liabilities. Any costs arising from a condition pre-existing at the time of the execution of the contract amendment, would be DOE's responsibility and not ours. It occurs to me that the negotiation of that point alone could go on interminably.

Set A Time Limitation of Claims.

The proposed rule provides that the contractor is liable for claims made by DOE after termination of the contract. Such an open-ended arrangement does not make for sound contracting. The earliest possible resolution of claims is greatly preferred. This time limit should apply to each six-month award fee evaluation period and to the termination of the contract. A time limit, preferably as short as feasible, should be established for making such claims. I recommend a maximum period of six months after each evaluation period following each award fee and after contract termination for this purpose.

Litigation Control and Costs.

Under the present rules, DOE pays the costs of litigation arising under the contract and has the right to take over and control such litigation. The proposed rule proposes that the contractor be liable for judgments, costs and litigation expenses arising out of certain cases. In the past, for policy reasons, DOE has maintained control of cases and at times has decided not to follow
contractors' recommendations concerning strategy, settlement or even selection of counsel.

It is not appropriate in my opinion for DOE to maintain control of cases on the one hand and require contractors to pay all costs on the other. It is only logical that DOE must assume all costs of cases it seeks to control. Furthermore, an adverse decision in a DOE controlled case may set a precedent and jeopardize a number of subsequent cases. DOE ought to assume responsibility for these cases too. DOE has a greater burden than just paying for the cases it controls.

In conclusion, EG&G believes the proposed rule should not be adopted because, if enacted, it would be harmful to DOE, to the contractors and to the team attitude that has been so beneficial to this country for over 40 years.

Thank you.

Senator EXON. Thank you, Dr. Kerr. Mr. Pitts, do you have an opening statement?

Mr. PITTS. Yes, I do.

Senator EXON. Please proceed.

## STATEMENT OF SAMUEL R. PITTS, VICE PRESIDENT FOR ENVIRONMENTAL AFFAIRS, WESTINGHOUSE ELECTRIC CORPORATION

Mr. PITTS. Thank you. My name is Samuel R. Pitts and I am the Vice President of Environmental Affairs for the Westinghouse Electric Corporation. I am responsible for all the environmental matters that affect the corporation, including regulatory compliance, site remediation, industrial hygiene, and employee and product safety. My responsibilities also include oversight of those activities at the seven Department of Energy sites for which Westinghouse is the management and operating contractor. Some of those sites are Savannah River; Hanford, Washington; Fernald, Ohio; and so forth.

I realize that this committee is short on time so I will try to make my statement concise.

We feel the Department of Energy in the proposed rule-making has recommended drastic changes for reimbursing costs incurred by the M&O contractors in performance of their contracts and would impose substantial liabilities on the contractors. We firmly believe that these changes, if implemented, would be counterproductive in the accomplishment of the mutual goals of both the Department of Energy and my company, Westinghouse. The proposed changes as presently drafted are so significant that Westinghouse would not be able to accept them as modifications to existing contracts or as the basis for negotiation of new contracts.

We have communicated this to the Department of Energy, and a copy of our comments is attached to my testimony today. While I will not go over all of our concerns about the proposed rule, I do wish to highlight the major points. One of the primary concerns is that the proposed rule will inevitably result in an increasingly adversarial relationship between the Department of Energy and its contractors.

This will substantially interfere with the accomplishment of the Department of Energy's mission, whether the mission is one of production or environmental clean-up. We envision excessive conserv-

atism on the part of all parties, an unending series of disputes and litigation between the Department of Energy and its contractors. Such an outcome would destroy the responsive relationship the Department requires from its contractor to fulfill its assigned tasks.

The magnitude of risks that the proposed rule would require contractors to accept must also be passed on to subcontractors and suppliers. This situation has the potential to cause the shrinking of the industrial base supporting the operation of these facilities, drive up governmental costs, and seriously undermine the opportunity of small businesses and suppliers to support and participate at the Department of Energy sites. Moreover, it is unreasonable to require contractors to be asked to accept increased liability, fines, penalties, and litigation costs without contractors having the requisite control over the facility and its personnel and without a guarantee of the availability of sufficient funding to effect the changes that are required.

To make matters worse, the proposed rule does not sufficiently define the areas of concern to enable the contractor to know precisely what situations will expose it to liability. The contractor would also be left without an ability to cover these increased risks by insurance or by some compensatory factor to be added to costs which are reimbursed. We feel strongly that where insurance is available, its cost is a legitimate expense of doing business and must be allowable under the contracts.

Our concern about the proposed Department of Energy rule is also heightened by the physical situations that exist at Department of Energy facilities. The facilities are old and will require significant funding to bring them into full compliance with applicable environmental laws. Some estimates indicate that it will take decades and a cost of tens of billions of dollars to accomplish this goal. At many of the sites near-term operations are impossible without technical violation of environmental regulations. Indeed, at some facilities the on-site storage of waste violates environmental rules, but there are no facilities off-site where these wastes can legally be disposed. The Department of Energy is now attempting to solve this problem by entering into federal facility compliance agreements with the Environmental Protection Agency and State agencies.

Numerous groups have sought assistance of the courts to remedy perceived abuses, requesting remedies that have little regard for national balance, national priorities, or technical feasibility. While executives, managers, and workers at these sites strive to comply with all mission priorities, including environmental ones, their attention is increasingly drawn to potential criminal exposure, liability, and tort litigation or negative coverage in the press or in Congress.

Let me clearly state that Westinghouse will not tolerate criminal behavior and strongly believes that Admiral Watkins's openness has been long overdue. However, we realize that allegations are easier to make than to disprove. With 20/20 hindsight, many events look differently today than they did when decisions were being made by previous administrations and contractors. With front page media accounts of alleged injuries and abuses, a hesitant and defensive mindset exists and is intensifying as time passes.

Westinghouse is committed to working under Admiral Watkins's leadership to achieve the standards of performance, excellence, and environmental compatibility he has set for himself, his Department, and his contractors.

Our goals at Westinghouse are clear: one, to carry out our management and operating contracts while maintaining safe practices and procedures; and two, to achieve and maintain environmental compliance with a strong commitment to operational excellence. If these goals are to be achieved as expeditiously as possible, we believe that the mission at each of the sites must be clearly defined, time-phased resources must be committed to corrective actions, and M&O contractors and Department of Energy personnel must work together as a team. Without these factors, I fear consequences that will threaten the Department of Energy's basic mission: national security and environmental compliance. Yet, in light of the current developments discussed today and the proposed rule-making, it does not appear that we are headed in this direction.

Finally, we feel that any new relationship between the Department and its contractors should be built upon the existing mechanism for disciplining and rewarding contractors, the fixed fee and the award fee, rather than through the imposition of a drastic change of increased liability and cost unallowability, which would drive Westinghouse and other quality contractors out of management and operating contracts.

Westinghouse has always considered it a privilege to work with the Department of Energy on the vital missions assigned to it. We hope that our responsive and cooperative relationship will continue to flourish, and we are committed to working with the Department in this effort.

Thank you very much, Mr. Chairman, and I will be pleased to answer any questions you may have.

The prepared statement of Mr. Pitts follows:]

Statement of Samuel R. Pitts
Vice President, Environmental Affairs,
Westinghouse Electric Corporation

Mr. Chairman, and members of the Subcommittee, I am pleased this morning to have the opportunity to testify before your committee on behalf of the Westinghouse Electric Corporation.

As Vice President of Environmental Affairs for Westinghouse, I am responsible for all environmental matters affecting the Corporation, including regulatory compliance and site remediation, industrial hygiene and employee and product safety. My responsibilities also include oversight of these activities at the seven Department of Energy sites for which Westinghouse is the Management and Operating (M&O) contractor.

Westinghouse is an M&O contractor at DOE's Feed Materials Production Center in Fernald, Ohio; Idaho National Engineering Laboratory at Idaho Falls, Idaho; the Hanford Plant in Richland, Washington; the Waste Isolation Pilot Project in Carlsbad, New Mexico; the West Valley Nuclear Demonstration Project in West Valley, New York; and the Savannah River Project in Aiken, South Carolina. Westinghouse also has an M&O contract for the Bettis Atomic Power Laboratory.

Our objective in this strong GOCO participation is not solely to enhance our business portfolio, but also to advance technology, enhance the working relationship between government and industry and to directly participate in our nation's defense development. The government spends over $3 billion a year under these contracts, but the actual fee received by Westinghouse is on the order of one percent of that amount. The fee the Corporation receives represents a very small portion of the total Westinghouse corporate profits. However, inasmuch as these contracts traditionally required limited risk and investment to the Corporation, they enable us to achieve our objectives without jeopardizing the profitability of the Corporation.

In our long-standing and proven relationship with the DOE, we are proud of our work and commitment, proud of our continuing close relationship with the Department; and, very proud of our commitment to pursuing and attaining the highest standards of excellence. We share with the DOE and Admiral Watkins a commitment to operate these facilities in full compliance with all applicable environmental health and safety rules and regulations.

We are very concerned that these efforts not be undermined by what we see as a very disturbing trend of events. We are all now becoming increasingly aware of the magnitude of liabilities associated with the complex, from cleanup costs in the billions to the ever-increasing number of lawsuits involving DOE sites. Some of these lawsuits claim personal injury and property damages running into the millions of dollars - others threaten to prevent or shut down operations due to alleged environmental conditions.

Environmental enforcement activities have moved from assertions of civil violations to allegations of personal and corporate criminal behavior. At least one DOD site has seen Federal employees convicted of criminal violations of environmental laws.

Legislation has been introduced in the Congress to void certain indemnification provisions in existing DOE contracts and to increase contractor liability for environmental conditions present contractors have had little or no control over.

Finally, the Department of Energy in a proposed rulemaking has recommended drastic changes for reimbursing costs incurred by the M&O contractors in performance of their contracts and would impose substantial liabilities on the contractors. We firmly believe that these changes, if implemented, would be counterproductive in the accomplishment of the mutual goals of DOE and Westinghouse.

The proposed changes as presently drafted are so significant that Westinghouse would not be able to accept them as modifications to existing contracts or as the basis for negotiation of new contracts. We have communicated this to the DOE and a copy of our comments are attached to my testimony today. While I will not go over all of our concerns with the proposed rule, I do wish to highlight the major points:

One of our primary concerns is that the proposed rule will inevitably result in an increasingly adversarial relationship between the Department of Energy and its contractors. This will substantially interfere with the accomplishment of DOE's mission - whether that mission is one of production or environmental cleanup. We envision excessive conservatism on the part of all parties and an unending series of disputes and litigation between DOE and its contractors. Such an outcome would destroy the responsive relationship the Department requires from its contractor to fulfill its assigned tasks.

The magnitude of risks that the proposed rule would require contractors to accept must also be passed on to subcontractors and suppliers. This situation has the potential to cause the shrinking of the industrial base supporting the operation of these facilities, drive up governmental costs, and seriously undermine the opportunity of small businesses and suppliers to participate at DOE sites.

Moreover, it is unreasonable to require contractors to be asked to accept increased liability, fines, penalties, and litigation costs without contractors having the requisite control over the facility and its personnel and without a guarantee of the availability of sufficient funding to effect the changes that are required. To make matters worse, the proposed rule does not sufficiently define the areas of concern to enable the contractor to know precisely what situations will expose it to liability. The contractor would also be left without an ability to cover these increased risks by insurance or by some compensatory factor to be added to costs which are reimbursed. We feel strongly that where insurance is available its cost is a legitimate expense of doing business and must be allowable under contracts.

Our concern about the proposed DOE rule is also heightened by the physical situations that exist at DOE facilities. The facilities are old and will require significant funding to bring them into full compliance with applicable environmental laws. Some estimates indicate that it will take decades and a cost of tens of billions of dollars to accomplish this goal. At many of the sites, near-term operations are impossible

without technical violation of environmental regulations. Indeed at some facilities, the on-site storage of waste violates environmental rules, but there are no facilities off-site where these wastes can legally be disposed. The DOE is now attempting to solve this problem by entering into Federal Facility Compliance Agreements with the EPA and State agencies. Numerous groups have sought assistance of the court to remedy perceived abuses, requesting remedies that have little regard for national balance, national priorities, or technical feasibility. While executives, managers, and workers at these sites strive to comply with all mission priorities, including environmental ones, their attention is increasingly drawn to potential criminal exposure, liability in tort litigation, or negative coverage in the press and in Congress.

Let me clearly state - Westinghouse will not tolerate criminal behavior and strongly believes that Admiral Watkins' openness has been long overdue; however, we realize that allegations are easier to make than to disprove. With 20/20 hindsight, many events look differently today then they did when decisions were being made by previous administrations and contractors. With front-page media accounts of alleged injuries and abuses, a hesitant and defensive mindset exists and is intensifying as time passes.

Westinghouse is committed to working under Admiral Watkins' leadership to achieve the standards of performance, excellence and environmental compatibility he has set for himself, his Department and his contractors. Our goals at Westinghouse are clear - (1) to carry out our management and operating contracts while maintaining safe practices and procedures and; (2) to achieve and maintain environmental compliance with a strong commitment to operational excellence.

If these goals are to be achieved as expeditiously as possible, we believe that the mission at each of the sites must be clearly defined, time-phased resources must be committed to corrective actions, and M&O contractors and DOE personnel must work together as a team. Without these factors, I fear consequences that will threaten DOE's basic mission -- national security and environmental compliance. These current developments that I have discussed do not signal that we are moving toward such a relationship or plan.

Finally, we feel that any new relationship between the Department and its contractors should be built upon the existing mechanism for disciplining and rewarding contractors - the fixed fee and the award fee - rather than through the imposition of a drastic change of increased liability and cost unallowability which would drive Westinghouse and other quality contractors out of management and operating contracts.

Westinghouse has always considered it a privilege to work with the Department of Energy on the vital missions assigned to it. We hope that our responsive and cooperative relationship will continue to flourish and we are committed to working with the Department in this effort.

Thank you. I will be pleased to answer whatever questions you may have.

Westinghouse
Electric Corporation

Samuel R Pitts
Vice President
Environmental Affairs

Westinghouse Building
Gateway Center
Pittsburgh Pennsylvania 15222

March 23, 1990

Mr. Stephen D. Mournighan
Office of Policy, MA-402
Procurement and Assistance Management
Washington, DC 20585

RE: Acquisition Regulation
Notice of Proposed Rulemaking and Request for Comments
55 Federal Register 2786 (January 26, 1990):
Comments of Westinghouse Electric Corporation

Dear Mr. Mournighan:

Enclosed are the comments of Westinghouse Electric Corporation to the Department of Energy's Notice of proposed rulemaking to amend the Department of Energy Acquisition Regulations (DEAR).

Westinghouse has significant difficulties with all aspects of the proposed rule, and except for the section dealing with Price Anderson fines and penalties, it cannot accept any portion of the rule as drafted. We urge that the Department give serious consideration to these comments. We hope there will be follow-up meetings with Westinghouse and other M&O contractors in order to develop a more workable approach to any modification of the Regulations.

Sincerely,

Samuel R. Pitts

Enclosure

3140o

cc: Leo P. Duffy
W. Henson Moore
Berton J. Roth
Victor Stello

## WESTINGHOUSE ELECTRIC CORPORATION COMMENTS

### SUMMARY

Westinghouse Electric Corporation hereby offers our comments to the January 26, 1990 Federal Register Notice of Proposed Rulemaking, which would change certain acquisition regulations governing the Department of Energy's profit making Management and Operating (M&O) contractors. Except for the section dealing with fines assessed under the Price Anderson Amendment Act of 1988, Westinghouse cannot accept any part of the proposed rule as drafted. In its present form, the rule would very likely force Westinghouse and other highly qualified contractors out of DOE management and operating contracts. We do not believe this is the Department's intention.

Westinghouse recommends that the proposed rule be withdrawn and that DOE and its M&O contractors engage in good-faith discussions to develop a more realistic approach to the shifting of risks and responsibilities at DOE sites. Such a dialogue would put DOE in a better position to propose a more reasonable and workable approach to change.

### PURPOSE

Today, Westinghouse is an M&O contractor at seven facilities. We are proud of our technical performance as well as our standards of excellence in safety, environmental protection, and production. Like other M&O contractors, Westinghouse has maintained a close working relationship with the DOE to assist in fulfilling its vital mission for national defense and energy development. We believe we can continue to play an important part in this mission.

If implemented, the proposed rule would install an approach that is not only unproven but which does not consider the realities of distribution of risks in a business environment. There is also a great likelihood that the new approach would not achieve the stated objective of the proposed rule.

The Deputy Secretary of Energy, in his October 24, 1989 testimony before the House Subcommittee on Environment, Energy

and Natural Resources, stated that the Department wants to "aggressively demand greater management accountability and fiscal responsibility" from the contractors but realizes "there may not be many countervailing incentives" for the M&O contractors who "will continue to compare the rewards they receive to the risks they perceive . . . ." The solution "is not to place all the responsibility or blame on our contractors or to craft solutions that place them in an impossible situation." Yet that is what implementation of the proposed rule as drafted would do. We firmly believe that issuance of a new rule in the proposed form would have serious and lasting consequences for the mission and the continued presence of quality, committed M&O contractors.

Many of the facilities suffer from inadequate government funding to meet current laws and environmental concerns. Most need modernization and environmental remediation. DOE's own policies and insufficient Congressional funding largely are responsible for the inadequate condition of some sites. DOE's intention to abandon its contractor reimbursement rules can be seen as an attempt to disassociate itself from its own responsibilities.

The Department has also indicated that one of the purposes of the proposed rule is to provide incentives for contractors to operate DOE facilities as they would commercial plants. Unfortunately, the proposed rule would make this impossible without putting the contractors at unacceptable financial risk.

Westinghouse cannot accept any part of the proposed rule as drafted, except for the section dealing with the disallowance of costs incurred in paying fines assessed under the Price Anderson Amendments Act of 1988. That is not to say that Westinghouse is unwilling to consider any modification of the current acquisition rules, but the proposed rule as drafted simply provides a disincentive to a continued, cooperative effort between the Government and the M&O contractor. Instead, it is likely to lead to an adversarial relationship promoting distrust and skepticism.

The proposed rule is also flawed because it can only be fully evaluated in terms of the enhanced fee structure DOE has indicated it would implement to partially offset what is a

substantially increased risk, and that proposed change has not yet been published.

These comments will discuss what Westinghouse perceives to be some of the fallacies behind the proposal, the impact of the proposal on the existing relationship, and then focus on the specific changes proposed to the Department of Energy Acquisition Regulations (DEARs).

## THE DOE-M&O RELATIONSHIP AND THE COMMERCIAL ARENA

It appears to Westinghouse that the proposed rule is premised on a set of circumstances and conditions which simply do not exist. Westinghouse has consistently met the objective stated in the Notice that Westinghouse, as an M&O contractor, apply "the same expertise, skills, and prudence to the management and operation of DOE's facilities as [it applies to its] non-government, commercial production facilities." DOE may believe that changes contemplated by the rulemaking would bring an M&O contractor closer to the risk burdens of private enterprise, but the analogy to the corporation's commercial businesses has no factual basis.

An M&O contractor lacks the control at DOE facilities that it has in its other businesses. DOE owns the facilities, provides and controls the funding, sets the overall policies, determines priorities and is involved in the day-to-day management. As noted by a DOE official in testimony to the Congress: "These contractors engage in a special working relationship with DOE to operate unique and specialized Government-owned facilities . . . . DOE contractors operate Government-owned facilities under DOE direction and with DOE and Congressional control over the 'purse strings'. DOE contractors do not have a 'free hand' to decide manpower levels or the upgrading of nuclear facilities . . . ." (Statement of James W. Vaughn, Jr., Principal Deputy Assistant Secretary for Nuclear Energy, DOE, Hearings Before the Subcommittee on Energy Research and Development, Committee on Science, Space and Technology, U.S. House of Representatives: "H.R. 1414, The Price-Anderson Amendments Act of 1987", June 17, 1987, pages 7, 11-12.)

On the other hand, in the commercial world, the contractor or supplier controls the funding and has total responsibility for management, including the evaluation of corporate risks. It engages in comprehensive planning and has the ability to implement those plans. Proposed changes are not compromised based on policy considerations of the Government, undisclosed long-term plans or relationships between the DOE field office, other field offices and DOE headquarters.

An M&O contractor is not able to conduct the kind of due diligence typical for a prospective purchaser or lessee, but rather must accept the facility on an as-is basis, notwithstanding a site which has often suffered from long-term neglect. At its commercial facilities, Westinghouse has always taken immediate steps to come into compliance with governmental regulations. The Department, by its own acknowledgment, has not as promptly addressed conditions at its facilities. In a June 28, 1989 Washington Post article, the Secretary was quoted as saying "the chickens have finally come home to roost [with respect to the DOE facilities] and years of inattention to changing standards and demands regarding the environment, safety and health are vividly exposed . . . ." There are a number of illustrations where past practices at a DOE facility have contributed to present difficulties. In some instances, a site's prior contractor was not contractually required to comply with DOE orders. Thus, when a new contractor takes over, the facility is not in compliance with many previously issued orders relating to health, safety and the environment. The ability of the new contractor to then develop an appropriate schedule for achieving compliance is further complicated by the lack of documentation on the compliance status at the facility.

Private businesses are free to hire whom they want, pay salaries they wish to pay, and provide training programs and employee motivational and morale programs. In contrast, M&O contractors are required to retain the existing work force, are restricted in the salaries they can pay; and do not have the same flexibility in hiring, firing and training employees that is found in the commercial arena.

Westinghouse believes one of the larger fallacies contained in DOE's proposed approach is the lack of recognition of

standard commercial practice. The price charged by a contractor or seller in the commercial world as well as its time and materials rates (for service work) contain not only direct labor costs and amounts for G&A, but also factors for risk, insurance, employee malfeasance, injury to third parties, and damage to property of the buyer or other third parties.

Rather than decreasing incentive for excellence in performance, a price which takes into account these potential costs actually increases incentive because avoidance of those costs will result in additional profit. The potential to earn higher fees, which DOE has indicated it will propose, is simply not the commercial equivalent of a known price to be realized after the sale.

FINES AND PENALTIES
[970.3102-21, 970.5204-13(e)(12), 970.5204-14(e)(10)]

The proposed rulemaking will significantly alter the way in which fines and penalties and related litigation costs are treated for cost allowability purposes. The Notice inaccurately assumes reimbursement of fines and penalties leaves an M&O contractor without motive to comply with the law. The evidence simply does not support this assumption. Westinghouse has ample incentive to be in compliance when it is managing and operating facilities for DOE. Its reputation is just as much at stake when it is acting as an M&O, even though the ability to effect compliance is not always within its control. A poor compliance record can affect not only its shareholders' views of the corporation and the price of Westinghouse stock, but also the company's ability to effectively compete for other government business and its interactions with the environmental regulators in its commercial businesses. The proposed changes are also coming at a time when the regulatory agencies are aggressively pursuing the M&O contractors because they are frustrated in their attempts to proceed directly against DOE.

Under existing contract practice, DOE reimburses its M&O contractors for fines and penalties as long as those costs are not the result of the willful misconduct or lack of good faith on the part of the contractor's managerial personnel. This is

consistent with government cost reimbursement contracts generally [DEAR 970.3102-21, 42 USC 7256a, FAR 31.205-15(a)]. Under the proposed rule, however, a profit making M&O contractor could avoid cost disallowance of such costs only if (1) its actions were specifically authorized by the contracting officer, or (2) if the contractor notified the contracting officer of the noncompliance and DOE did not provide the necessary authorizations or appropriations to correct the violations. Such a clause is too restrictive for the following reasons:

First, reimbursement could be denied even where such costs are incurred as a result of compliance with the provisions of the contract, its statement of work or DOE Orders, Notices or other directives.

Second, the M&O contractor, in the exercise by DOE of both day-to-day control and oversight management, receives direction from a number of DOE representatives who are not the contracting officer.

Third, "specific direction" by the contracting officer is likely only in rare cases.

Fourth, the existing condition of the facilities often is the result of years of neglect. The cure for noncompliance is not simply authorization or funds, but rather ample time to complete all the work necessary to come into compliance or the development of technologies, or construction of treatment facilities.

Fifth, the expansion of the class of persons whose actions can trigger disallowance does not take into account the less than total control which a contractor can exercise over the hiring, retention, training and termination of its employees.

Any change in the policy with respect to disallowance of fines and penalties would also have to take into account the existing condition of the facility, the amount of effective control over the contractor's personnel, and the direction of operations generally, as well as the time required to achieve compliance. The latter is even more important when the

technology to achieve compliance does not exist or treatment or disposal facilities are not available. The exception to disallowance must also be expanded from one of "directed or authorized" by the DOE to one permitting allowability if DOE has acquiesced in the act or omission or if DOE failed to object when it knew or should have known of the contemplated action.

LOSSES [970.5204-13(e)(17)(iv), 970.5204-14(e)(15)(iv)]

The proposed rules change the standard of cost disallowance for non-nuclear losses from one of either willful misconduct or lack of good faith on the part of a very limited group (directors, officers and supervising representative) to "common law negligence" of a very broad class, including all of the contractor's employees, its subcontractors, and the employees of those subcontractors. Under this section of the proposed rule, it specifically calls out avoidable costs falling within three broad categories: (a) additional programmatic expenses, (b) third party claims, and (c) litigation expenses.

(a) Additional Programmatic Expenses

The proposed clause dealing with losses for which the contractor would be responsible uses the terminology "additional programmatic expenses," but fails to provide any reasonable guidance as to what falls within such a term. It is assumed, correctly or incorrectly, that the "additional increments necessary to carry out the same task, a second time" discussed in the background material set out in Section III, paragraph 3, are meant to be the commercial equivalent of rework and examples of "additional programmatic expenses."

The background material was more limited in the application of the disallowance of costs, requiring that the work be "well understood . . . [and] clearly within the sole and exclusive control of the contractor," and continuing to allow "costs and expenses which are routinely incurred in the ordinary course of doing business and are not extraordinary occurrences." However, even if the qualifying language contained in the background material

was included in the clause itself, there is no identification of the standard to which the contractor is being held. There is no definition of when a project would be considered to have been satisfactorily performed or when a portion would have to be re-performed at the contractor's expense. There is also no indication of how the grey or questionable areas would be handled, or whether the Department would include any number of other items as "additional programmatic expenses."

In any event, the concept of making the cost of rework unallowable is inconsistent with government cost reimbursement contracting. FAR Part 46 and the contract provision found at FAR 52.246-5 require that when the services performed or the supplies provided do not meet contract requirements, a contractor must either re-perform the work at cost, which is charged to the Government, but with no additional fee, or accept a reduction in fee if the government accepts the service with the deficiency. The contractor is not required to re-perform the work at its own cost as the DOE proposed rule would provide. That concept is embodied only in fixed priced contracts.

The concept is also inconsistent with the commercial world, where some rework is neither an unusual phenomenon nor evidence of negligence. The price of goods and services, whether performed on a fixed-price or on a time-and-materials basis, includes a factor which can compensate for any re-performance of work that may be required. There is often a warranty reserve to cover the costs of rework which becomes necessary after the product is delivered or the service performed. No equivalent concept exists within the M&O contract.

(b) Third Party Claims

The proposed rule would make third party liability claims unallowable costs. It remains an allowable cost in other government cost-type contracts. FAR 52.228-7, Insurance-Liability to Third Parties, which is used in cost-reimbursement contracts other than M&O contracts, provides for reimbursement of liabilities to third parties which are not covered by insurance, regardless of whether

the liabilities are caused by the negligence of the contractor's employees, agents or servants. The only exception is for those liabilities arising out of the willful misconduct or lack of good faith by the contractor's managerial personnel.

In a commercial business, a contractor or seller includes the costs of insurance for these risks in the price of the work.

The vagaries of negligence law also make this proposed change more difficult for an M&O contractor to accept. With the same fact situation, a finding of negligence in one jurisdiction may engender no liability in another. The proposed rule and explanatory material provide no guidance on the effect of a judicial finding. If the judge or jury found no evidence of negligence, would that be dispositive to the contracting officer? A contractor would also be concerned that a finding of negligence by a judge or jury, whether because of sympathy to the plaintiff or otherwise, would mean an automatic disallowance of the cost. Similarly, it should not be evidence of negligence and costs should not be disallowed if a contractor, in the exercise of good business judgment, determines it was more cost effective to settle a claim than to continue to litigate. The rule provides no means to resolve such issues, placing full responsibility on the M&O contractor to resolve the problems and assume the costs.

(c) Litigation Expenses

The proposed rule would make litigation expenses incurred in bringing or defending claims related to (a) and (b) above unallowable costs. Since item (a) is always an allowable cost there is, of course, no precedent for such a position. As to item (b), the cited FAR clause specifically makes the litigation costs allowable. In the commercial world these costs, to the extent not covered by insurance, would be costs that would be part of the price or time and materials rates.

Thus, in both other government cost-reimbursement contracts and in commercial contracts these costs are recoverable either

directly or through a contractor's overhead.

Any change in the policy with respect to disallowance for so called "avoidable" costs in these areas must take into account several factors. There is currently no way in a cost-type contract for the contractor to increase its "costs" in order to develop a fund or reserve or to enable it to cover the cost of insurance premiums. Until this concept can be dealt with in a cost-type contract, DOE cannot expect to shift any of this burden to the M&O contractor. Even if this can be accomplished, DOE would have to do more, enabling the parties to know how negligence would be established for the purposes of the M&O contract and the effect of the court process on the allowability of costs. Finally, the same concerns discussed under the Fines and Penalties section exist with respect to expansion of the class of people whose actions could lead to disallowance.

In the Federal Register Notice at p. 2798, DOE posed the question of whether a contractor's refusal to let the Government control litigation should somehow prejudice the contractor's other rights. Clearly the answer is No. The correlative question which should have been asked is "whether the contractor's allowing the Government to control the litigation prejudices the contractor's rights." The answer to that question is clearly Yes. The contractor cannot be expected to subordinate its own interests, particularly those which would be newly created by DOE's proposed rules, to those of DOE for no better reason than that DOE would like to control the contractor's litigation. If DOE desires the right to take over or direct any litigation for its own motives then the Government should expect to bear all the costs, including those of settlement, unfavorable judgment, and the like.

GOVERNMENT PROPERTY [970.5204-21(j)]

(a) DAMAGE TO GOVERNMENT PROPERTY

The proposed rule would impose on an M&O contractor liability for damage, loss or destruction of government property caused by the negligence of any employee of the contractor or its subcontractors. The Government's policy with

regard to liability for damage to government property is set forth in FAR 45.103(b), which provides:

> Generally, Government contracts do not hold contractors liable for loss of or damage to government property when property is provided under . . . 1) Negotiated fixed-price contracts . . . ; (2) Cost-reimbursement contracts; or (3) Facilities contracts . . . .

FAR 45.103(c) provides an exception to this policy when the contractor is using the government property primarily for commercial work rather than for government work, but an M&O contract prohibits the contractor from using the government property for commercial work. Further, FAR 45.103(e) permits a prime contractor to flow this policy down to subcontractors.

The contract clauses which implement this government policy, FAR 52.245-5 Government Property (Cost-Reimbursement, Time-and-Material, or Labor-Hour Contracts), provide that a contractor is not responsible for loss of or damage to government property unless the loss is caused by the willful misconduct or lack of good faith on the part of the contractor's managerial personnel.

Thus, the proposed rule would impose greater financial responsibility on an M&O contractor for damage to or loss or destruction of government property than that imposed upon other government cost-reimbursement contractors. This is a contradiction of expressed Government policy which has been developed and proven over many years. This concept also fails to take into account the limited control that the contractor has over its personnel and the condition and control of the facilities.

A matter not addressed in the proposed rule is the significant problem of quantifying the damage to government property for which the contractor is to be responsible. Since many of the facilities are unique, there is no comparison that can be made to other property to determine value. Also, there is frequently no market for the property outside the Government. The values at which the facilities are carried on the Government or contractor books are frequently arbitrary or bear little relationship to either current value or replacement

cost. Since most of the facilities are aging, it is unlikely that they would be replaced by the same or even similar facilities. Further, the condition in which the facility has been kept over the years may have a considerable impact on the costs of repair or replacement. None of these issues have been addressed in the proposed rule.

Another problem not addressed in the proposed rule is how the determination will be made as to whether the damage arose from the negligence of the contractor, DOE, a predecessor contractor, or another DOE contractor. The administrative costs of such determinations, both in terms of money and management attention, could be staggering.

In addition, there are a number of discrepancies between the introductory remarks in the proposed rule and the language of the rule itself. For example, paragraph 1 of Section III of the Notice states that reimbursement will not be allowed when the costs are the "result of extraordinary, nonroutine circumstances"; however, that language does not appear in the rule. The paragraph also indicates an intention not to disallow the costs of "scrap, waste and other routine damages or losses which occur as part of the cost of doing business and are reasonably anticipated"; but again this language is not contained in the rule.

In commercial contracts, when work is done on a customer's property, liability for damage to customer property can be limited. Protection for any remaining liability can be provided through insurance. The cost of the insurance is passed on to the customer in the price as part of the overhead.

(b) LOSS OF GOVERNMENT PROPERTY

The proposed rule would make losses from theft, embezzlement or other malfeasance by contractor or subcontractor employees unallowable. The introductory comments also talk of "ultra vires" acts, a term which is neither defined in the proposed rule nor used elsewhere in this context. This again is inconsistent with government cost principles, traditional concepts of master-servant relationship, the concept of independent contractors and good commercial practice.

The cost principle, FAR 31.205-19(a)(3)(ii), specifically makes allowable the cost associated with minor losses. The cost principle is a reflection of the recognition that in the real world some losses do occur. It takes into consideration the cost/benefit concept in the loss of property. If a contractor takes reasonable steps to control losses, it should be reimbursed for losses that occur. Otherwise, the contractor would be inclined to spend inordinate amounts of the Government's money on security systems to protect against any loss without regard to whether the cost of avoiding the loss is commensurate with the amount saved. With unlimited funds, perhaps a security system could be devised that would prevent any loss, but the value of such a system must be balanced against the cost.

An additional problem arises on many sites because the M&O contractor who, under the proposed rule, would suffer the unallowed cost is not the contractor that has responsibility for security at the site and, therefore, does not have the ability to control security and prevent the losses.

In commercial contracts, the cost of losses for which the contractor is liable is either covered by insurance or charged to the buyer through overhead. In either event, the cost is borne by the buyer.

A problem that has not been addressed in the rule with respect to loss or damage to property of the Government relates to negligence of other parties. At most DOE locations there is more than one M&O contracto,r and at all locations there are DOE contractors other than the M&O which can have an impact on the facilities. The proposed rule does not address consequences of negligence of more than one of these contractors. Moreover, since the proposed rule will not apply to the other DOE contractors on the site, there may be a situation where the M&O contractor is 5% negligent and another DOE cost-reimbursement contractor to whom the rules do not apply is 95% negligent. Yet, presumably under the proposed rule, the M&O contractor would bear the entire burden of the loss. This may be avoided if the M&O contractor, at its own cost brought a legal action against the other contractor seeking contribution; however, there is no assurance that the other contractor will have sufficient assets to cover the

liability. The court might also find that the duty of the other contractor was to DOE and not to the M&O contractor, leaving the M&O contractor with no recourse. Similarly, if the M&O contractor is only slightly negligent and a predecessor contractor's negligence was the major cause of the loss, the proposed rule as drafted could make the current M&O contractor responsible for the entire loss.

BONDS AND INSURANCE [970.5204-13(e)(36), 970.5204-14(e)(34)]

The proposed rule would make unallowable the cost of insurance to cover the new risks placed upon the M&O contractor. This position is inconsistent with the government cost principles as expressed in FAR 31.205-19, Insurance and Indemnification, which makes allowable the costs of insurance for the risk of loss of or damage to government property to the extent the contract makes the contractor liable for such loss or damage. DOE is attempting to make the profit making M&O contractors, but no one else, insurers of government property without compensating them for the cost of insurance or providing a mechanism for reimbursement of the costs required to develop a reserve to cover the potential of damage to or loss of government property.

The proposed position on insurance is also inconsistent with commercial practice. Prudent businesses insure against risks and losses. The cost of insurance is normally included in the price to the customer. Even though under the proposed rule DOE would not treat insurance costs as allowable expenses, an M&O contractor may still find it prudent to obtain coverage for risks which DOE is seeking to shift to the contractor, paying for coverage from corporate funds. However, those premium costs, which are likely to be quite high because of the replacement value of the sites, would serve to lessen even further any perceived benefit flowing from performance as an M&O contractor. Moreover, insurance is not presently available for many of the risks DOE proposes that the M&O contractor assume, making the proposed rule's position on contractor responsibility for loss of or damage to government property completely unreasonable.

SUBCONTRACTORS

Throughout the proposed rule, it is clearly indicated that an M&O contractor must be responsible for the actions of its subcontractors. Currently an M&O contractor is required to select subcontractors in accordance with the "federal norm". This requires that selection be made, to the extent possible, on a competitive basis and that preferences be given to certain contractors to meet government socioeconomic objectives. The M&O contractor is, thus, restricted in its ability to select what it deems to be the best subcontractor for the task. In addition, inasmuch as DOE requires control over procurements and procurement procedures and often directs the selection of the subcontractor, it must accept some responsibility for the activities of those subcontractors. If DOE expects a contractor to take on responsibility for certain actions of its subcontractors and subcontractor employees, it must allow the M&O contractor to select subcontractors in the same manner it would in a commercial setting. This would require relief from the requirements of many contract provisions and from the requirement to follow the "federal norm". The inevitable result would be that fewer subcontracts are likely to be awarded to small businesses, minority-owned businesses, etc.

If the M&O contractor is to be responsible for the acts of all subcontractor employees, costs would be substantially increased as the M&O contractor demanded back-up protection from the subcontractors and refused to deal with subcontractors who were not sound financially. It would also have the effect of driving some subcontractors, particularly small subcontractors, out of the business. Those subcontractors that are still willing to continue doing business will pass along the increased costs of these risks in their price, thereby increasing the cost to the Government.

CONTROL OVER PERSONNEL

Another theme which runs throughout the proposed rule is that an M&O contractor should be responsible for the acts of all of its employees. This concept ignores the realities of the DOE-M&O system. Most M&O contractors must manage a work force which is already in place when the contract is awarded.

A new M&O contractor is obligated by DOE to retain the employees of the previous contractor. Thus, an M&O contractor starts with a work force with which it is largely unfamiliar and which is likely to be committed to the culture of the prior contractor or of DOE. The operational culture of a work force is difficult to change and cannot be changed overnight, as has been clearly pointed out by the current Secretary of Energy.

This problem is compounded by other employment-related factors. DOE puts limitations on virtually all employment practices, training plans, salary plans, certain individual salaries and employee motivational programs. When an M&O contractor brings in people from its own organization, DOE puts limits on benefits and other conditions of employment. These employment and benefit limitations significantly hamper an M&O contractor in obtaining an optimal work force. DOE must recognize that if it desires to continue these controls, it cannot expect the contractor to accept full responsibility for the actions of all of the employees.

CONDITION AND CONTROL OF FACILITIES

One of the circumstances that further militates against placing liability upon an M&O contractor for damage to government property or fines and penalties that result from the operation of the facility is the condition and control of the facility. DOE requires that an M&O contractor accept government facilities on an "as is, where is" basis. Frequently, inventories of property are unreliable, if they exist at all. Facilities are old and "as built" drawings, to the extent they exist, are not accurate. Records of maintenance and alteration of facilities may be sketchy at best. The contractor must rely on the work force it inherited to determine if a facility or piece of machinery can be operated in compliance with all laws and regulations.

In a commercial setting a contractor knows its facilities. It can make determinations as to what use a facility should be put and when it should be replaced or abandoned. In the M&O situation these are all decisions which DOE finally makes.

When a contractor takes over a facility, it must rely, at least for some period of time, on the documentation that it is

given to determine whether a facility is in compliance with all laws and regulations. For these reasons it is unreasonable to expect the contractor to immediately accept all liability that goes with operation of the facility.

ADDITIONAL CONCERNS

M&O contracts differ from other government procurements in that the government is contracting for a portion of its actual mission. This fact distinguishes M&O contracts from the typical product or service contracts entered into by the government. Additionally, it has dictated that a close working relationship exist between the DOE and its M&O contractor and that an open and responsive environment be maintained. Westinghouse believes that the DOE has failed to fully consider the disruptive effect promulgation of the new rules as proposed would have on the efficient and responsive conduct of work at DOE-M&O sites.

For example, instead of the existing relationship, communications will tend to become formal, centralized, and excessively detailed. A prudent contractor will require that most tasks be specifically and unambiguously directed by the contracting officer in writing or by a strict interpretation of contract terms.

Similarly, DOE representatives may be reluctant to advise, approve or direct the contractor, fearing that making such decisions might subject them to management disapproval if it is shown that DOE's participation might prevent the disallowance of costs. One could anticipate that each party will attempt to maximize its position with respect to any potential dispute rather than focusing on the task at hand, and protracted and bitter negotiations on a multitude of performance related questions could result.

The same friction and formalized relationships can be expected to occur between the M&O contractor and its subcontractors, as well as with the other M&O contractors at a facility. A prudent contractor will always attempt to shift the risk of cost unallowability or responsibility for loss or damage to subcontractors who will in turn resist. Because of

these concerns, procurements once easily placed may now take months or simply not occur at all. Similarly, unless DOE clarifies the rules, time and money are likely to be wasted and important projects delayed as multiple contractors at a site insist on the negotiation of protective agreements to protect one contractor against the acts of another. Lengthy and often wasteful litigation may follow.

DOE assumes that all of this will be acceptable to a contractor if the fees, which are not yet defined, will be commensurate with the risk. However, contractors may be hesitant about any arrangement where there is likely to be a continuing climate of hostility, rather than cooperation, regardless of the rewards.

Westinghouse is also concerned that the new rule will be differentially applied, particularly when many of the concepts are so ill-defined. There is likely to be a divergence of enforcement approaches among the DOE field offices and between the field offices and DOE Headquarters, with some taking the position that DOE had issued a clear directive which the contractor violated but others viewing the direction to the contractor as ambiguous or as a suggestion rather than a mandatory order. The Defense Nuclear Facilities Board has already identified the same lack of clarity and specificity in the DOE orders and draft DOE orders, and a "lack of uniformity among such Orders as to whether they are mandatory, non-mandatory, or referenced for information." The variable application of DOE Orders and the new rule will present still another opportunity for the development of a fractious relationship between the Department and the M&O contractor. The interview with the DOE General Counsel appearing in the February 28, 1990 issue of Weapons Complex Monitor did little to assuage our concern in this area with his reference to responsibility for the determination of violations "still in the discussion stage," and procedures "[to] be developed as we go on."

FEE CONSIDERATIONS

The existing award fee system does not adequately compensate an M&O contractor for risks, increased unallowable costs and the additional corporate effort and involvement that

the contractor is facing today. Westinghouse has addressed this issue and the need for a modification of the existing fee structure through discussions with the respective field offices. We have not as yet received a satisfactory response to this issue.

In addition to our concern regarding the lack of resolution of this matter, the introductory language to the rule indicates that a revision to the M&O fee policy will take place simultaneously with this Rulemaking. However, no such proposed change has been forthcoming. It is thus inappropriate to expect a contractor to consider and comment on the Department's desire to impose even greater risks on an M&O contractor through the Rulemaking. Without the proposed "enhanced fee structure," the contractor has been given only one half of the equation.

CEILING ON CERTAIN LIABILITIES FOR M&O CONTRACTOR [970.5204-55]

The proposed ceiling on liabilities of the M&O contractor is a constructive notion; however, the manner in which it is constructed in the proposed rule will work counter to the philosophy of the award fee. FAR 16.404-2 sets forth the purpose of the award fee contract as being to provide motivation for excellence in such performance areas as quality, timeliness, technical ingenuity, and cost effective management. This is accomplished by having an amount in the award fee pool that will encourage the contractor toward these goals. With the ceiling on liability being the amount in the award fee pool, the contractor will be motivated to try to set the award fee pool as low as possible in order to minimize potential liability, and thus, the incentive of the award fee will be reduced. The contractor should always have a greater motivation to put more of the available fee in the award pool, and therefore, the award incentive would be allowed to work as intended. In any event, if a contractor is to accept a sharing of risks, the ceiling on a contractor's liability should be such that the contractor is not putting at risk its own corporate assets. It should do no worse than "break even."

The proposed rule further requires that the contractor provide ". . . in such form and amount as shall be satisfactory

to the contracting officer, a guarantee to assure that the contractor will have sufficient resources to satisfy all costs and liabilities up to the amount of the available award fee . . . and the guarantee shall remain in effect notwithstanding the completion, termination, or expiration of the contract." This provision runs contrary to the well-established and long-standing principles found in the FAR for termination of cost-reimbursement contracts. Even if terminated for default, the contractor is entitled to reimbursement for all costs incurred and is further reimbursed for claims arising from the contract but not yet asserted. In the commercial context contractors put both a financial and a time limit on their liability so that they are assured that all contract obligations have been discharged.

In this area, the proposed rule fails to address a number of important questions. What form of guarantee and amount will the contracting officer require? During the term of a contract, the potential award fee may vary greatly. Will the contracting officer use the largest of these as the guarantee amount? Will the contracting officer be able to adjust the amount to take into account these differences? What if the contractor is unable to provide the guarantee amount?

PROCEDURAL REQUIREMENTS

Finally, before DOE can implement a significant change in the cost principles like those proposed, compliance with the following procedural requirements will be necessary:

(a) Review Under Executive Order 12291

DOE must perform and consider a Regulatory Impact Analysis (RIA) in connection with these proposed regulations because Executive Order 12291(3)(a) requires such an analysis "in connection with every major rule." A major rule is a "regulation that is likely to result in: (1) An annual effect on the economy of $100 million or more; (2) A major increase in costs . . . for . . . Federal . . . government agencies . . .; or (3) Significant adverse effects on competition . . . ." E.O. 12291(b)

1. If DOE implements the proposed regulation, the following major financial impacts are likely and will result in increased costs to DOE and the Federal Government:

a) Even under the proposed rule, the premium cost of some insurance will be allowable, but each M&O contractor will incur substantial costs for insurance purchased by it. There will likely be duplication of coverage and correspondingly increased costs to DOE, since often the dividing line for allowable/unallowable costs cannot be determined in advance.

b) Increased manpower levels required to provide greater supervision and additional recordkeeping procedures and requirements, and additional security measures to minimize the possibility of employee malfeasance will increase allowable costs.

c) DOE has stated that the risk shifting will necessitate a corresponding increase in the award fee pool and costs to the Government.

d) The increased insurance demanded of subcontractors by the M&O will increase a subcontractor's allowable costs, or result in a higher price if it is a fixed price subcontract.

With these costs being incurred by approximately 32 for-profit contractors and/or hundreds of subcontractors, the impact on the economy (not just DOE's budget) in the threshold amount of $100 million appears likely.

The proposed notice will also involve a major rule under Executive Order 12291 because under subsection (1)(b)(3) competition will likely be adversely affected. The proposed increase in risk may cause one or more M&O contractors to choose not to seek renewal of an existing contract or it may dissuade a responsible business from submitting a proposal to win a contract. Also, because of the increase in costs passed on to an M&O's subcontractors, some subcontractors, particularly small businesses, may be foreclosed from competing, thereby substantially affecting competition.

(b) Regulatory Flexibility Act

As noted above, subcontractors will potentially contribute to an M&O's risk of loss through negligence, theft of government property, and vandalism (including damage to government software or computer systems). The economic impact of this risk can be countered only by (1) requiring that subcontractors provide higher limits of insurance (and, if insurance cannot be obtained, subcontractors will be required to provide assurance of financial responsibility through other means); and (2) requiring that subcontractor employees having access to government equipment be bonded. Since these risk-shifting measures are costly and may cause a substantial number of small businesses to no longer compete for these contracts, DOE must prepare and consider a Regulatory Flexibility Analysis, pursuant to 5 U.S.C. 603 and 604 as part of its rulemaking process.

(c) Paperwork Reduction Act

DOE did not comply with the requirements of the Paperwork Reduction Act and erred by failing to coordinate the issuance of the proposed rules with OMB. Under the Paperwork Reduction Act (Act), a "collection of information" is defined as "the obtaining or soliciting of facts or opinions by an agency through the use of . . . reporting or recordkeeping requirements . . . ." (44 U.S.C. 3502(4). See also 5 C.F.R. 1320.7(c).) The Act also provides that "an agency shall not conduct or sponsor the collection of information unless, in advance of the adoption or revision of the request for collection of such information--(1) the agency has taken [various] actions [enumerated in the subsections that follow]." (44 U.S.C. 3507(a).)

The proposed rule recognizes that it would create new categories of unallowable costs and that changes to a contractor's accounting system will be necessary to account for the new cost categories. The proposed rule also identifies changes to existing DEAR Sections 970.5204-13, 970.5204-14, and 970.5204-21. DEAR Section 901.105 reveals that OMB control numbers have already been issued for these sections. Consequently, DOE's conclusion that OMB clearance is not required is incorrect for two reasons. First, the proposed

rule contemplates one new section, 970.5204-55, and new subsections to various existing DEAR regulations, as well as the recognition of a need to make changes in a contractor's accounting and recordkeeping systems to accommodate the new regulations. Thus, the proposed regulation calls for a new "collection of information," thereby invoking the procedures of 5 C.F.R. 1320.13 (Clearance of collections of information in proposed rules). Second, at the very least, in light of the existing OMB control numbers for the above-referenced DEAR sections, the proposed rule constitutes a "revision of [a current] request for collection of information" within the meaning of 44 U.S.C. 3507.

CONCLUSION

We ask that DOE give serious consideration to all comments submitted to it and the very real concerns expressed by the M&O contractors. If DOE adopts the rule as published, we believe that competent, qualified contractors will be forced out of the M&O business. Many of those same contractors are not opposed in principle to change, but the Department must adopt a more realistic and reasoned approach.

It is Westinghouse's recommendation that the proposed rule be withdrawn from consideration at the present time. In statements made to DOE prior to publication of the proposed rulemaking, Westinghouse offered to work with the Department in implementing a pilot program at one of its sites. This would have permitted the negotiation and incorporation of certain changes and the evaluation of the effectiveness of the approach. Since DOE chose not to accept our offer, we now recommend that a series of working meetings be held between the Department and its M&O contractors to develop a more realistic approach to the shifting of risks.

DOE would then be in a better position to propose a more reasonable and workable approach to change, which could then be published as a new Notice of Proposed Rulemaking.

Senator EXON. Thank you, Mr. Pitts. Mr. Christesen, please proceed.

## STATEMENT OF RUSSELL J. CHRISTESEN, CHAIRMAN EMERITUS, EBASCO SERVICES INCORPORATED

Mr. CHRISTESEN. Mr. Chairman and members of the subcommittee, my name is Russell J. Christesen and I am Chairman Emeritus and former President and Chief Executive Officer of the Ebasco Services in New York.

Ebasco provides engineering and design, construction, consulting, and quality management services to the electric utility and energy-related industries, and government, including considerable work for the Department of Energy. For example, Ebasco is currently under contract to develop a conceptual design for the new production reactor at the Department of Energy Savannah River facility. We are also a leading participant in the Department of Defense environmental restoration program. Our experience includes major environmental, management, and consulting contracts as well as actual on-site remediation for the Department, including the clean-up of Basin F at Rocky Mountain Arsenal. Ebasco's current work on subcontracts to managing and operating contractors includes heavy emphasis on quality assurance and safety.

Let me say at the outset that we totally support the Department's underlying goal of clarifying contractor responsibility and providing additional incentives directed toward improved accountability. But, we also share the concern of other contractors, M&O contractors, and strongly believe that there will be a problem in any contractual relationship wherein contractors are held responsible for conditions or actions beyond their control. Ebasco's testimony today will focus on the impact that we believe the proposed rule will have on the M&O subcontractor community.

As proposed, the regulations could and in many cases would effectively prohibit highly qualified, well-capitalized companies such as our own from undertaking subcontractors to Department of Energy M&O contractors. Such companies would choose to back off from pursuing this type of work because they would be unwilling to expose their full asset base to risks which cannot be defined.

The proposed rules do recognize that increase liabilities assumed by M&O contractors entitle them to an increased fee, as well as necessitating a cap on those liabilities. This cap allows the M&Os in some ways to quantify their financial risk. However, the proposed rule fails to reflect any consideration of the same important issues of fee level and liability cap which also affects M&O subcontractors.

The proposed rule would allow the M&O to insist that subcontractors assume disproportionate liability, and we would get into all kinds of arguments about that; and perhaps the M&O would insist on being held harmless, while the subcontractor would receive none of the additional fee.

Ebasco has suggested an alternate approach which would meet the Department of Energy's policy goal of increasing contractor responsibility through utilization of financial incentives.

First, we suggest that the proposed regulations be amended so that the liability of the M&O subcontractor parallels that of the M&O, using the same formulas for capping the liability. Both parties face the same issues; both parties have identical concerns.

Second, we suggest that the Department of Energy's profit policy guidance be revised to enable M&Os to set higher fee limits for subcontractors, to properly compensate them when they do assume increased liability.

If adopted, as proposed, we believe that the negative impact of the rules will be most severe on the programs in the areas of most concern to the public: health, safety, and the environment. It is in these areas liability, and especially third party liability, is a critical issue in the determination of whether a well-capitalized company, such as Ebasco, will propose to bid on any particular project.

Ebasco believes that the net effect of the proposed rule on the subcontractor community will be a significant lessening of competition, resulting in increased costs for M&O subcontractor work. Large, experienced, and well-financed contractors will no doubt decline to participate in certain Department of Energy programs, depriving the Nation of the benefit of their skills and expertise in this critical area at this critical time.

Mr. Chairman, that concludes my prepared statement. I will be pleased to answer any questions you may have.

[The prepared statement of Mr. Christesen follows:]

STATEMENT OF

MR. RUSSELL J. CHRISTESEN

CHAIRMAN EMERITUS

EBASCO SERVICES INCORPORATED

MR. CHAIRMAN AND MEMBERS OF THE SUBCOMMITTEE, MY NAME IS RUSSELL CHRISTESEN AND I AM CHAIRMAN EMERITUS OF EBASCO SERVICES INCORPORATED. I HAVE BEEN WITH EBASCO FOR MORE THAN 38 YEARS, HOLDING POSITIONS INCLUDING PRESIDENT AND CHIEF EXECUTIVE OFFICER.

EBASCO PERFORMS ENGINEERING, CONSTRUCTION, ENVIRONMENTAL, ADVANCED TECHNOLOGY AND QUALITY MANAGEMENT SERVICES TO GOVERNMENT, UTILITY AND PRIVATE SECTOR CLIENTS THROUGHOUT THE WORLD. WITH MORE THAN 5,000 EMPLOYEES, EBASCO HAS 85 YEARS OF EXPERIENCE IN MANY SECTORS OF THE ENERGY BUSINESS, INCLUDING CONSIDERABLE WORK FOR THE U.S. DEPARTMENT OF ENERGY (DOE). FOR EXAMPLE, EBASCO IS CURRENTLY UNDER CONTRACT TO DEVELOP A CONCEPTUAL DESIGN FOR THE NEW PRODUCTION REACTOR AT THE SAVANNAH RIVER SITE IN SOUTH CAROLINA.

WE WERE THE SYSTEMS INTEGRATOR AND DESIGNER OF TODAY'S MOST ADVANCED FUSION REACTOR, THE TOKAMAK FUSION TEST REACTOR AT PRINCETON UNIVERSITY, AND WE ARE NOW INVOLVED IN THE DESIGN OF THE NEXT GENERATION OF FUSION TECHNOLOGY -- THE COMPACT IGNITION TOKAMAK. FOR THE DOE, WE DESIGNED THE ADVANCED TEST REACTOR AND THE POWER BURST FACILITY AT THE IDAHO NATIONAL ENGINEERING LABORATORY, AND WE ARE NOW DEVELOPING THE SUPERCONDUCTING MAGNETIC ENERGY STORAGE SYSTEM FOR THE OFFICE OF STRATEGIC DEFENSE INITIATIVE. EBASCO ALSO IS PLAYING A LEADING ROLE IN THE DEPARTMENT OF DEFENSE ENVIRONMENTAL RESTORATION PROGRAM. OUR EXPERIENCE INCLUDES MAJOR ENVIRONMENTAL ENGINEERING CONTRACTS AS WELL AS ACTUAL ON SITE REMEDIATION FOR THE DEPARTMENT, INCLUDING THE CLEANUP OF BASIN F AT ROCKY MOUNTAIN ARSENAL.

IN MARCH, EBASCO SUBMITTED WRITTEN COMMENTS TO THE DOE IN RESPONSE TO THE NOTICE OF PROPOSED RULEMAKING ON THE REIMBURSEMENT AND INDEMNIFICATION ON ITS MANAGEMENT AND OPERATIONS (M&O) CONTRACTS. THE COMMENTS ARE ATTACHED WITH AN EXTENSIVE LIST OF

CONTRACTS WE ARE CURRENTLY PERFORMING FOR M&O CONTRACTORS OF THE DOE. EBASCO'S WORK ON THESE FACILITIES INCLUDES ENVIRONMENTAL, DESIGN, CONSTRUCTION AND QUALITY ASSURANCE/SAFETY CONTRACTS WITH A HEAVY RECENT EMPHASIS IN THE ENVIRONMENT AND QUALITY/SAFETY AREAS. WITHIN THE LAST 30 DAYS EBASCO WAS AWARDED A $23 MILLION CONTRACT TO ASSIST IN THE HAZARDOUS WASTE REMEDIAL INVESTIGATIONS AT THE DOE'S HANFORD WASHINGTON FACILITY. THIS EXPERIENCE IN MANY DIFFERENT AREAS OF THE DOE HAS GIVEN US A BROAD PERSPECTIVE FROM WHICH TO COMMENT.

MY PURPOSE, TODAY, IS TO CONVEY TO THE COMMITTEE THE DETRIMENTAL IMPACT THAT WE FEEL THIS RULE, AS PRESENTLY WRITTEN, WILL HAVE ON THE SUBCONTRACTOR COMMUNITY. I WILL ALSO COMMENT ON THE IMPACT THE RULE MAY HAVE ON THE DOE'S ABILITY TO MEET ITS LONG-TERM MISSION.

EBASCO SUPPORTS THE DEPARTMENT'S UNDERLYING GOAL OF INCREASING AND CLARIFYING CONTRACTOR RESPONSIBILITIES IN EXCHANGE FOR PROVIDING ADDITIONAL FINANCIAL INCENTIVES. ALTHOUGH WE SUPPORT THE DEPARTMENT'S GOAL, WE DO NOT BELIEVE THE PROPOSED RULE AS PRESENTLY WRITTEN WILL MEET THE DEPARTMENT'S STATED OBJECTIVE.

A NUMBER OF THE CONTRACTOR PANELISTS TODAY WILL OUTLINE VALID CONCERNS WITH THE PROPOSED RULE. EBASCO'S FOCUS TODAY IS ON THE IMPACT THE RULE WILL HAVE ON THE M&O SUBCONTRACTOR COMMUNITY.

THE PROPOSED REGULATIONS WOULD PRECIPITATE A FUNDAMENTAL CHANGE IN THE BUSINESS RELATIONSHIPS BETWEEN THE DOE AND THE M&O CONTRACTOR COMMUNITY. THE CONTRACTUAL FLOW DOWN EFFECT OF THESE REGULATIONS WOULD RESULT IN A FUNDAMENTAL CHANGE IN THE RELATIONSHIP BETWEEN THE M&O'S AND THEIR SUBCONTRACTORS.

AS PROPOSED, THE REGULATIONS COULD EFFECTIVELY PROHIBIT HIGHLY QUALIFIED, WELL CAPITALIZED COMPANIES, SUCH AS EBASCO, FROM SUBCONTRACTING TO THE M&O CONTRACTORS OF THE DOE. COMPANIES WILL HAVE NO CHOICE BUT TO WITHDRAW FROM PURSUING THIS TYPE OF WORK BECAUSE THEY WILL NOT EXPOSE THEIR FULL ASSET BASE TO RISKS WHICH ARE NOT DEFINED QUALITATIVELY OR QUANTITATIVELY.

THESE RULES RECOGNIZE THAT THE NEW LIABILITIES ASSUMED BY THE

M&O CONTRACTORS ENTITLE THEM TO AN INCREASED FEE AS WELL AS A LIABILITY CAP. THE CAP ALLOWS THE M&O'S TO QUANTIFY THEIR FINANCIAL RISK. HOWEVER, THE RULE AS PROPOSED FAILS TO REFLECT THAT THESE SAME ISSUES OF FEE-LEVEL AND LIABILITY-CAP AFFECT THE M&O SUBCONTRACTORS. THE RULE WOULD ALLOW THE M&O TO INSIST THAT A SUBCONTRACTOR TAKE DISPROPORTIONATE LIABILITY OR EVEN HOLD THE M&O HARMLESS, WHILE THE SUBCONTRACTOR WOULD RECEIVE NONE OF THE INCREASED FEE.

FLOW DOWN PROVISIONS OF THIS PROPOSED RULE ARE CLEARLY INEQUITABLE AND WOULD NOT RESULT IN INCREASED M&O RESPONSIBILITY AS THE DOE'S POLICY SO CORRECTLY INTENDS. RATHER, IT WOULD ENCOURAGE M&O'S TO PASS LIABILITY DOWN THE LINE. WITH INCREASED, UNCAPPED LIABILITY AND NO OFF-SETTING FEE INCREASE, EBASCO AND SIMILARLY SITUATED CONTRACTORS WOULD CHOOSE NOT TO CONTINUE OPERATION AS SUBCONTRACTORS TO THE DOE.

EBASCO SUGGESTS AN ALTERNATE APPROACH WHICH WOULD MEET THE DOE'S POLICY GOAL OF INCREASED CONTRACTOR RESPONSIBILITY THROUGH THE UTILIZATION OF FINANCIAL INCENTIVES. WE SUGGEST THAT THE REGULATIONS BE REVISED SO THAT THE LIABILITY OF THE SUBCONTRACTOR PARALLELS THAT OF THE M&O. THE SAME FORMULA FOR A LIABILITY CAP SHOULD BE APPLIED TO THE M&O AND THE SUBCONTRACTOR. SIMPLY STATED, THE M&O SUBCONTRACTOR SHOULD HAVE ITS POTENTIAL FEE AS ITS LIABILITY CAP.

THE DOE SHOULD ALSO REVISE ITS PROFIT POLICY GUIDANCE SO THAT M&O'S WOULD SET HIGHER FEE LIMITS FOR SUBCONTRACTORS TO COMPENSATE FOR THE INCREASED LIABILITY WHICH THEY ASSUME. THE EXACT LEVEL OF THE FEE WOULD STILL BE DETERMINED BY THE M&O IN THE MARKETPLACE. THE DOE'S PROFIT POLICY GUIDANCE SHOULD RECOGNIZE THAT, TO THE EXTENT M&O SUBCONTRACTORS ASSUME GREATER RISK, THE M&O SHOULD HAVE AUTHORITY TO GRANT HIGHER FEES. THIS APPROACH MAKES POLICY SENSE AND WOULD ENSURE AN ADEQUATE POOL OF HIGHLY QUALIFIED AND HIGHLY MOTIVATED M&O SUBCONTRACTORS.

IF ADOPTED AS PROPOSED, THE RULE'S NEGATIVE IMPACT WILL BE THE MOST SEVERE IN THE AREAS OF MOST CONCERN TO THE PUBLIC -- HEALTH,

SAFETY AND THE ENVIRONMENT. IN THESE AREAS, LIABILITY AND ESPECIALLY THIRD PARTY LIABILITY IS THE CRITICAL ISSUE IN DETERMINING WHETHER A WELL CAPITALIZED COMPANY SUCH AS EBASCO WILL BID A PARTICULAR PROJECT. WITHOUT THE INVOLVEMENT OF WELL CAPITALIZED AND HIGHLY QUALIFIED COMPANIES, SUCH AS OURS, IT WILL NOT BE POSSIBLE FOR THE DOE TO MEET ITS MISSION.

AS AN ENGINEER WHO HAS SPENT MUCH OF HIS WORKING LIFE IN THE U.S. NUCLEAR INDUSTRY, I AM CONCERNED THAT THIS RULE MAY LEAD TO THE FURTHER EROSION OF THE U.S. NUCLEAR INDUSTRIAL BASE. WHAT I SEE INCREASINGLY IS A DECLINING NUMBER OF HIGHLY QUALIFIED CONTRACTORS WILLING TO COMPETE. AT A TIME OF TREMENDOUS CHALLENGE FOR THE DEPARTMENT, IT IS NOT IN THE DEPARTMENT'S NOR TAXPAYERS' INTEREST TO FURTHER REDUCE THE AVAILABLE COMPETITION. WE ALL KNOW THAT KEEN COMPETITION BETWEEN QUALIFIED COMPANIES PRODUCES THE BEST RESULTS.

IN SUMMARY, EBASCO BELIEVES THAT THE NET EFFECT OF THIS RULE, WILL BE TO SIGNIFICANTLY LESSEN COMPETITION AND CONSEQUENTLY INCREASE THE COSTS TO THE DOE FOR M&O SUBCONTRACTOR WORK. LARGE WELL-FINANCED CONTRACTORS WILL BE UNWILLING TO EXPOSE THEIR FULL ASSETS TO THE POTENTIAL LIABILITIES INHERENT IN THE DOE WORK WITHOUT A LIABILITY CAP AND FEE INCREASE COMMENSURATE WITH THE LEVEL OF RISK. REDUCED COMPETITION WILL INCREASE THE COST OF PROGRAMS, WHILE DECREASING THEIR QUALITY. LARGE EXPERIENCED AND WELL-FINANCED CONTRACTORS WILL NO DOUBT DECLINE TO PARTICIPATE IN THE DOE PROGRAMS, DEPRIVING THE NATION OF THE BENEFIT OF THEIR SKILLS AND EXPERTISE IN THIS CRITICAL AREA AT THIS CRITICAL TIME.

MR. CHAIRMAN, THIS CONCLUDES MY PREPARED STATEMENT. I WOULD BE PLEASED TO ANSWER ANY QUESTIONS YOU OR ANY MEMBERS OF THE SUBCOMMITTEE MAY HAVE.

EBASCO SERVICES INCORPORATED

EBASCO

Two World Trade Center, New York, N.Y. 10048-0752, (212) 839-2200

Richard F. Albosta
Chairman of the Board,
President and Chief Executive Officer

March 23, 1990

Mr. Stephen D. Mournighan
Office of Policy, MA-402
Procurement and Assistance Management
U.S. Department of Energy
Washington, D.C. 20585

Dear Mr. Mournighan:

Ebasco Services Incorporated appreciates this opportunity to submit comments on the proposed regulations to revise the Department of Energy Acquisition Regulations (DEAR), the long-standing rule on reimbursement and indemnification of nuclear contractors.

Ebasco, with more than 5,000 employees, has been in business for more than 80 years and has extensive experience in many sectors of the energy business, including work for the Department of Energy. For example, Ebasco is currently under contract to develop a conceptual design for the New Production Reactor.

The proposed regulations would precipitate a fundamental change in the business relationships between the Department of Energy and the Management and Operations (M&O) contractor community. The contractual flow down effect of these regulations will also result in a fundamental change between the M&Os and their subcontractors. As a significant Department of Energy M&O subcontractor (Attachment I), Ebasco is concerned about the effect of these proposed regulations.

As proposed, the regulations would effectively prohibit highly qualified well capitalized companies, such as Ebasco, from subcontracting to the Department of Energy M&Os. Such companies will have no choice but to withdraw because they cannot expose their full asset base and their future to risks which are not defined qualitatively or quantitatively.

These rules explicitly recognize that new liabilities assumed by the M&Os entitle them to an increased fee structure as well as a liability cap. The cap allows the M&Os to quantify their indefinite or incalculable financial risk. However, the proposed rule fails to reflect that these same issues of fee-level and liability-cap affect the M&O subcontractor community. In fact, the Department places unfettered power to allocate the new liability in the hands of M&O contractors. The rule would allow the M&O to insist that a subcontractor, if it wanted work, take disproportionate liability or even hold the M&O harmless, while getting none of the increased fee.

continued.....

The flow down provisions of this proposed rule are inequitable and would not encourage M&O responsibility as the Department of Energy policy intends. Rather, it would encourage M&Os to pass liability down the line while pocketing increased fees. The Business climate created by these regulations for M&O subcontractors would be intolerable. Ebasco and similarly situated contractors would not be able to continue operation as subcontractors to the Department of Energy M&Os with increased, uncapped liability and no off-setting fee increase.

Ebasco offers an alternate approach which would meet the Department of Energy policy goal of increased contractor responsibility and incentives. The regulations should be revised to parallel the liability of the subcontractor with that of the M&Os. The same formula for a liability cap should be applied to the M&O subcontractor. In simple terms, the M&O subcontractor should have its potential fee as its liability cap.

In addition, the Department of Energy should revise the profit policy guidance provided to M&Os to set higher fee limits for subcontractors to compensate for the increased liability which they assume. The exact level of fee would still be determined by the M&O in the marketplace. The Department of Energy fee guidance should recognize that, to the extent M&O subcontractors assume greater risk, the M&Os should have authority to grant higher fees. This approach makes policy sense and would ensure an adequate pool of highly qualified and highly motivated M&O subcontractors.

In summary, Ebasco believes that the net effect of this rule, as presently wirtten, will be to lessen competition for M&O subcontractor work. Large well-financed contractors will be unwilling to expose their assets to the potential liabilities inherent in Department of Energy work without a liability cap and fee increase commensurate with the level of risk assumed. Reduced competition will increase the cost of programs, while decreasing their quality. Many large well-financed contractors will decline to participate in Department of Energy programs, depriving the nation of the benefit of their skills and expertise in this critical area.

We look forward to serving the Department of Energy and supporting the new policy of risk/reward but need assurance that the M&O subcontractors will have the same incentives as the M&P prime contractors.

Very truly yours,

R F Alberts

RFA:JRB
Enc. (Attachment I)

**ATTACHMENT I**

**EBASCO PROJECTS FOR Department of Energy M&O CONTRACTORS**

Project Location: **SAVANNAH RIVER**
M&O Contractor : Westinghouse Savannah River Company
Projects:

Integrated Resource Management Systems (IRMS) - $5 Million
Cost, scheduling, resource prioritization for nuclear plant reactor restart and operation

Safety Management Contract (RSIP) - $5.6 Million
Safety analysis of reactor

Testing and Inspection services - $25 Million
Field quality control and non-destructive testing

Vendor surveillance - $7.5 Million
Field expediting and inspection of procured materials

Basic Ordering Agreement - $3.5 Million
Second quality assurance engineering, training and quality control for Westinghouse/Bechtel staff

Project Location: **OAK RIDGE**
M&O Contractor : Martin Marietta Energy Systems
Projects:

Hazardous Waste Remedial Action Project (HAZWRAP) - $30 Million anticipated amount
Subcontract to DOE for DOD at Air Force bases in the Pacific northwest

Waste Management Support - $2 Million
Task Order Agreement to provide support and expertise to document preparation

Air Modelling - $100,000
Provide expertise in computer development of air model; no analysis required

Project Location: **IDAHO**
M&O Contractor : EG&G Idaho
Projects:

Fuel Process Restoration (FPR) - $37 Million
One year; Build a facility as part of a chemical plant designed by Parsons

Basic Ordering Agreements (22 agreements)

Project Location: **ROCKY FLATS**
M&O Contractor : EG&G
Projects:

High Resolution Shallow Reflection Seismic Survey - Geotechnical support services

Technical Services for Mixed Radioactive/Hazardous Waste
and Geotechnical Waste Management Services BOA -
About $2 Million per year; total $10 Million
Environmental support services

Engineering Services BOA -
About $2 Million; total $10 Million
Technical support services

Project Location: HANFORD
M&O Contractor : Westinghouse Hanford Company
Projects:

Basic Ordering Agreement - $250,000
Regulatory services

Individual Service Contractor - $25,000
Health physics services provided by Dr. David Waite

Regulatory services - $225,000

Project Location: WEST VALLEY
M&O Contractor : Westinghouse - West Valley Nuclear Services
Project:

Task Order Contract - $10,000,000
Engineering, design and construction inspection services.

Senator EXON. Thank you, Mr. Christesen. Mr. Gleason.

**STATEMENT OF GEORGE GLEASON, SENIOR VICE PRESIDENT AND GENERAL COUNSEL, NUS CORPORATION, AND CHAIRMAN OF THE FEDERAL ACTION COMMITTEE OF THE HAZARDOUS WASTE ACTION COALITION**

Mr. GLEASON. Thank you, Mr. Chairman. I am here today in my capacity as Chairman of the Federal Action Committee of a group of companies known as the Hazardous Waste Action Coalition. This is about 100 companies under the auspices of the American Consulting Engineers Council, which is several thousand well-known engineering firms throughout the country.

This is the first time our group has had an occasion to appear before this committee. We are a new element in this equation. Our companies are the companies that specialize in the clean-up of hazardous waste sites. We have devoted the last decade or two to learning how to do that, we are the people with the expertise in this area who will be called on increasingly by the Department of Energy and the Department of Defense and the other agencies to assist either directly as contractors or as subcontractors to the M&O in the clean-up of these hazardous waste problems that they are facing.

Unfortunately, because we are the new kid on the block here, the rule which the Department of Energy has published here does not take into account the special liabilities which are undertaken by our companies by nature of the hazardous activities that we are involved in.

You know that typically States have rules that they call the Good Samaritan rules. In other words, somebody who goes into a

dangerous situation and undertakes a dangerous task is recognized as not being held to the same standards of liability as other people. Congress has recognized this special status for our firms in the Superfund legislation. After operating under Superfund for 4 or 5 years they concluded that these types of firms—which are technically known as response action contractors, RACs. You will hear that term increasingly in the future: RACs, response action contractors, the firms who specialize in the clean-up work—Congress has recognized in section 119 of the Superfund law that these companies ought to be subject to different rules of liability, like Good Samaritans in State law, and they have provided in section 119 that our types of companies engaged in clean-up activities would only be held liable for their own negligence and at the Federal level would be compensated, indemnified for that negligence. This special status of our companies is recognized by Congress in the Superfund law. However, in the rule which has been promulgated by the Department of Energy, there is no recognition of this special status of the special liabilities that attach to our types of firms, and it is probably because we are the new kid on the block. There is nothing in there that directly assesses this problem.

Now, the Department of Energy has a lot of problems that they are confronting in the operation of their facilities, and one of the large problems, as we look down the road here and particularly at the Department of Defense, is the enormous clean-up problems that they face. Congress is appropriating, even in the face of decreasing budgets, large amounts of money for environmental restoration.

I am going to tell you a problem that you are going to hear about in the near future from a lot of people because it is percolating right to the top of the problem. The money that Congress is authorizing and appropriating for these programs, agencies increasingly are going to be unable to obligate funds because firms like ours, the RACs, the clean-up firms, are not able to get insurance, but particularly for these Federal construction jobs where you have to go in and clean up.

Under the Federal Miller Act, we are required to have surety bonds. The Corps of Engineers has already begun to experience an inability to find qualified firms who can get surety bonds, and as a result they are unable to obligate the funds that you folks are appropriating. The corps has a recent study on this that the committee may not be aware of, and you may want to inquire with them as to the direction in which this problem is going. But my message to you is that the funds that you are authorizing and appropriating are not going to be able to be obligated to these firms by the agencies because the clean-up firms are not going to be able to get surety bonds. They cannot get insurance, and this is going to be exacerbated by the Department of Energy rule. The Department of Energy rule not only does not address those problems, but it puts these types of firms into the same category as other firms who do not have these special liabilities.

Now, we support and we share with the M&O contractors the major problems that they have with this bill. We understand the major problems that contractors such as Ebasco have who are major subcontractors. We are a subpart of a subpart of this prob-

lem, and maybe that is the reason we were overlooked. But the fact is, we are a large part of the solution and unless this rule is modified to take into account the special status which Congress has already recognized elsewhere, it is going to have a devastating impact on the ability of the Department of Energy and the Department of Defense to get on with their jobs. Thank you.

[The prepared statement of Mr. Gleason follows:]

PREPARED STATEMENT OF
GEORGE GLEASON, CHAIRMAN OF THE FEDERAL ACTION COMMITTEE
OF THE HAZARDOUS WASTE ACTION COALITION

Good morning. My name is George Gleason and I am the Chairman of the Federal Action Committee of the Hazardous Waste Action Coalition, a coalition of members of the American Consulting Engineers Council. Our members are technical and engineering service companies involved in the cleanup of hazardous waste problems, including those found at facilities owned by the Department of Energy and the Department of Defense. I am honored to have this opportunity to testify, on behalf of the Coalition, before this joint hearing of the Subcommittees on Strategic Forces and Nuclear Deterrence, and Defense Industry and Technology, of the Senate Committee on Armed Services. Your consideration of Department of Energy contracting policy, including the January 26, 1990 proposed amendments to the Department of Energy acquisition regulations, is timely and constructive.

The Coalition consists of over 100 professional service firms that provide environmental response services to EPA and other federal agencies, as well as performing extensive work for state and local governments and for the private sector. Our members design and implement environmental cleanups required under the federal Superfund law, the federal Resource Conservation and Recovery Act, and various state laws and requirements. The Coalition's members include large and medium sized consulting engineering and scientific firms, as well as a number of small businesses. Throughout the United States, our member companies employ well over 25,000 people. The Coalition is environmentally proactive, with the mission to develop and promote approaches to hazardous waste management that are technically sound, timely and cost effective. Coalition members do substantial work for the Department of Energy, in most cases

as subcontractors for the Management and Operating contractors.

The Coalition members have carefully studied the proposed amendments to the Department of Energy acquisition regulations. We have concluded that the proposal will have an adverse effect on the Department's environmental programs, primarily because the proposal overlooks the unique problems associated with the cleanup of hazardous waste on the Department of Energy's facilities. If the regulations are issued as is, there will be fewer firms competing for DOE cleanup work, the safety and environmental effectiveness of such work will suffer, and the Department's costs will increase. My testimony will focus on the unique aspects of such environmental subcontracts and the need for the Department of Energy to implement a risk allocation policy that is more consistent with prior Congressional action on such matters.

Hazardous waste remediation companies face unique and high risks. We are part of an emerging industry, attempting to develop and apply new and sometimes untested technologies to large and hazardous environmental problems. Our member firms arrive at the hazardous waste site after the environmental contamination has occurred. Such preexisting environmental problems often have a high profile, involving tremendous controversy and a very high potential for litigation. When such litigation occurs, federal and state statutes, as well as common law juries, have created a regime of strict, joint and several, and retroactive liability for virtually anyone involved in the creation and/or the cleanup of such hazardous waste.

High risk aspects of our work include the following:

1. It is extremely difficult to predict and control the migration of liquid contaminants in a subsurface environment.

2. There is an absence of widely accepted standards to guide engineers in the investigation of sites and the design and implementation of remedies.

3. Time and resources available for site evaluation and

research is strictly limited because many hazardous waste problems require prompt action to meet statutory timetables and/or DOE priorities.

4. "Toxic tort" litigation is enormously expensive, extremely unpredictable, is characterized by extremely long latency periods, and involves huge potential liabilities.

5. Federal facility work entails additional risk considerations, such as the special legal defenses available to the sovereign, making the contractors a more likely target for plaintiffs' attorneys.

In 1986 Congress amended the Superfund law to relieve response action contractors of some of the heavy legal risks associated with their work. This was done in order to promote the existence and growth of technically and financially competent environmental cleanup contractors capable of performing this essential work at reasonable cost. Congress did three things. First, it added Section 119 to Superfund, exempting contractors at Superfund sites from strict liability under federal law and authorizing the United States to indemnify such contractors from negligence-based federal liability. The conference report stated that this was done because Congress knew that environmental remediation contractors play an "essential role in responding to releases caused by others." Second, Section 120 was added to Superfund, prescribing that federal agencies are subject to Superfund, including the response action contractor protection provisions of Section 119. Third, the Superfund amendments included a "Defense Environmental Restoration Program" for DOD facilities and the statute specified that the protections of Section 119 apply to remedial action contractors working at Defense environmental restoration sites.

Unfortunately, the proposed Department of Energy acquisition regulations fail to recognize the unique factual and legal status of response action contractors. The Department's proposed imposition of additional risk and liability on RACs runs

directly contrary to Section 119 of CERCLA which authorizes and encourages agencies to indemnify such contractors from negligence-based liability. Although Section 119 of CERCLA applies essentially to Superfund work, it represents a policy which should be incorporated into the acquisition regulations for all Department of Energy environmental work.

Based on these concerns, and others, the Hazardous Waste Action Coalition has submitted formal comments (copy attached) to the Department of Energy concerning its proposed amendments to the acquisition regulations. The Coalition has urged the Department of Energy to make it clear that its proposed regulations do not apply to response action contractors. The Coalition has asked the Department of Energy to state explicitly that DOE will continue to reimburse response action contractors for the potential liabilities associated with the cleanup of environmental problems at DOE facilities. It is our position that response action contractors are hired to clean up waste sites, not to join the ranks of the legally liable parties.

The Coalition has also asked the Department of Energy to consider the numerous contractor-subcontractor problems that the proposed acquisition regulations would create. The Coalition's primary concern is to assure that any "reallocation of the risks and rewards" associated with the Department of Energy contracts include and require a sharing of such risks and rewards with the subcontractors as well. In any event, these are complex contractual questions which require further thought before DOE should proceed.

As to the proposed acquisition regulations, the Hazardous Waste Action Coalition urges these Subcommittees, and the Department of Energy, to recognize the unique role of environmental response action contractors in the success and effectiveness of the Department of Energy's environmental cleanup programs. We believe that this unique status requires the continued reimbursement and indemnification of response action

contractors for environmental risks associated with their work in cleaning up the Department of Energy's hazardous waste sites. Insurance and other commercial risk allocation mechanisms are inadequate to support the continued existence of technically and financially viable hazardous waste cleanup contractors. The Coalition believes that these contracting policies are essential to the success of the Department of Energy's environmental cleanup program.

In a larger context, the Coalition wants to work with Congress to address the unique problems associated with hazardous waste cleanup contractor work and liabilities on a more fundamental basis that is broader than Superfund alone. There is a real need for legislation that will create a uniform standard of liability for our work. We believe that the general policy represented by Section 119 of Superfund is the correct approach that should be more broadly adopted: strict liability is inappropriate for response action contractors. In addition, even for negligence based liability, statutory amendments are necessary to assure that response action contractors are not swept into "joint and several liability" with the originators of the contamination, and to assure that the potential liability is subject to reasonable indemnifications and/or total dollar limitations.

In closing, thank you again for the opportunity to speak with you today. If you have any additional concerns or require any further information, I will be glad to try to answer any of your questions.

HAZARDOUS
WASTE
ACTION
COALITION

1015 Fifteenth Street, N.W., Washington, D.C. 20005 202-347-7474 FAX 202-898-0068

March 27, 1990

Stephen D. Mournighan
Office of Policy MA-402
U.S. Department of Energy
1000 Independence Avenue S.W.
Washington, D.C. 20585

**Subject: Comments on Proposed Department of Energy Acquisition Regulations**

Dear Mr. Mournighan:

The Hazardous Waste Action Coalition (HWAC), is pleased to take this opportunity to comment on the proposed amendments to the Department of Energy Acquisition Regulations (DEAR), published at 55 Fed. Reg. 2796, January 26, 1990. DOE has made a constructive attempt to deal with the important issue of management and operating contractor (M&O) accountability. Unfortunately, the proposal fails to recognize the very distinct status of response action contractors (RACs). RACs cleanup environmental contamination created by others, and work on DOE facilities almost exclusively as subcontractors to M&Os. HWAC recommends that the proposal be amended to exclude RACs expressly from its scope. Alternatively, if the proposed regulations are to cover RACs, they need to be rewritten and clarified extensively.

HWAC is an association of firms providing technical and engineering services for the cleanup of hazardous waste. The Coalition's members provide response action services to DOE and other federal agencies, to state and local governments, and to the private sector. HWAC's members have offices located throughout the United States and employ well over 25,000 people. The mission of HWAC is to develop and promote approaches to hazardous waste management that are technically sound, timely, and cost effective. In this context, HWAC is committed to assuring that the standards of professional practice within the hazardous waste industry result in the safe cleanup of environmental contaminants. For example, HWAC has helped the emerging hazardous waste cleanup industry establish loss prevention programs, sponsored health and safety training courses, and prepared guidelines on quality assurance/quality control programs.

It is HWAC's conclusion that the proposed regulations fail to distinguish the unique responsibilities of DOE's RAC subcontractors from those of the M&Os. RACs are part of the environmental solution and work in situations which are, by definition, hazardous. RACs are predominately small businesses that apply new and unproven technologies to extremely high profile

preexisting problems. It appears that RACs were not considered by DOE in drafting these proposed regulations, even though their plain language would seem to cover RACs.

HWAC urges DOE to consider RAC issues and to explicitly exclude RACs from coverage under this proposal. Failure to add this clarification will seriously undermine DOE's environmental cleanup efforts by increasing DOE costs, decreasing the quality of cleanups, reducing the number of qualified cleanup contractors and creating chaotic contractual problems between M&Os and RACs.

The following discussion is divided into two major sections. The first provides DOE with background as to the nature and practicalities of RAC work and the special legal status granted to RACs by Congress. This section also explains why the proposed amendments should explicitly exclude RACs. The second section identifies some of the very difficult and controversial contractor-subcontractor problems that would arise if DOE fails to exclude RACs from the proposal.

## I. UNIQUE STATUS OF RACS

### A. Nature of Work Performed by Response Action Contractors

Response action contractors are professional service companies (usually small businesses) that perform environmental compliance or remediation work for DOE, for other governmental agencies and for private parties. RAC activities typically involve hazardous waste sites or situations, including remedial actions or removals under the Federal Comprehensive Environmental Response Compensation and Liability Act of 1980, as amended, (CERCLA)[1/], corrective actions under the Federal Resource Conservation and Recovery Act, as amended, (RCRA)[2/], similar actions under state law, and any evaluation, planning, engineering, surveying and mapping, design, construction, equipment or ancillary services related to any release or threatened release of hazardous substances or any pollutants or contaminants.

The hazardous waste site remediation business is in many respects an emerging industry, attempting to develop and apply unproven technologies to large and pre-existing environmental problems. The legal liability of the owners and operators of such sites is strict, joint and several, and retroactive. The potential liability of RACs, the companies that arrive on the scene to provide help after the environmental damage has been done, is less certain. In this atmosphere of uncertainty, DOE must clarify that RACs are excluded from coverage by the proposed amendments in order to facilitate cost effective contracting of cleanup work.

The risks and consequent liabilities associated with the investigation and cleanup of hazardous waste, both at DOE facilities and elsewhere, are enormous and uncertain. There are a number of technical and legal factors which distinguish hazardous waste work from the actual day-to-day management and operation of DOE facilities, and therefore merit different consideration from DOE. These factors include the following:

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1/ 42 U.S.C. Section 9601 et seq.

2/ 42 U.S.C. Section 6901 et seq.

- Engineers at contaminated sites face the extremely difficult task of trying to predict and control the migration of liquid contaminants in a subsurface environment.

- Since hazardous waste cleanup is a relatively new endeavor, unproven and innovative technologies are the norm. There is an absence of widely accepted standards to guide engineers in the investigation of sites, and the design and implementation of remedies.

- Hazardous waste engineers are hired specifically to deal with pre-existing problems presenting unknown risks.

- The time available for site evaluation and research is strictly limited, since many hazardous waste problems require prompt action to meet statutory timetables and/or DOE priorities and to respond to the release or threatened release of dangerous toxic materials.

- Since contaminated sites are often at the center of notoriety and controversy, technical decisions are subject to constant challenge from a wide array of outside forces.

- Courts have been willing to reduce a plaintiff's burden of proof by requiring only a showing that exposure to toxic materials was a "substantial factor" in causing the plaintiff's disease or injury.

- "Toxic torts" are characterized by extremely long latency periods, since decades may separate the discovery of the disease or injury from the act or omission alleged to be the cause. It is extremely difficult to predict the standard of liability that may be applicable in the distant future.

- Toxic tort law has witnessed an expansion of theories of compensable harm, such as "fear of cancer," increased risk of cancer, and recurring medical examination costs.

- The complexity of toxic tort litigation may expose RACs to potentially enormous legal fees, even if they are ultimately absolved from liability.

- Property damage claims are potentially extremely expensive, as a hazardous waste release may require lengthy cleanup of a vast area under stringent statutory standards.

- DOE RACs are predominantly small businesses acting as subcontractors to much larger M&O contractors. Both the direct impact of DOE's proposal and the probable indirect impact of M&Os "flowing down" the risks, will disproportionately impact the smaller RACs.

The seven attachments to this letter, listed in the Appendix, provide DOE with more details as to the unique status of RACs.

B. CERCLA Section 119

Congress recognized the unique status of RACs by enacting Section 119 of CERCLA.[1] This provision, which was added in the Superfund Amendments and Reauthorization Act of 1986 (SARA) specifies that RACs working under CERCLA "shall not be liable under [federal law] to any person for injuries, costs, damages, expenses or other liability (including...claims by third parties for death, personal injury, illness or loss of or damage to property or economic loss)" which results from the release or threatened release of any hazardous substance, pollutant or contaminant, unless such liability is based on conduct by the RAC which is negligent, grossly negligent or which constitutes intentional misconduct. Section 119(c) then establishes an indemnification scheme, whereby the federal government is authorized to indemnify RACs against liability based on negligence. The United States Environmental Protection Agency (EPA) has regularly provided indemnification in many response action contracts, both before and after the enactment of Section 119. In essence, RACs are exempted from strict liability under federal (but not state) law and are indemnified from negligence based liability.

C. Congressional Intent

Section 119 was enacted because Congress recognized the RAC's "essential role in responding to releases caused by others."[4] Congress knew that competent and cost effective RACs are essential to the successful remediation of the nation's hazardous waste sites and that this infant industry needed to be fostered and protected from the potentially catastrophic liabilities associated with such sites. Section 119 was also written "in recognition of the inability of [RAC] contractors to obtain insurance in the current market."[5]

D. EPA Indemnification of RACs for Negligence

EPA has long recognized the need to give special consideration to the necessity of relieving RACs of some of their negligence-based pctential liabilities, in order to promote the existence of financially viable RACs capable of cleaning up hazardous waste sites at reasonable costs. Even before the enactment of Section 119, EPA provided broad indemnification to RACs.[6] In 1987, EPA issued its "Interim Guidance on Indemnification of Superfund Response Action Contractors Under Section 119 of SARA."[7] Very recently, EPA proposed to reissue and amend its RAC indemnification policy.[8] In all of these instances, EPA acknowledged the inadequacy of currently available commercial insurance mechanisms. Although the extent of the insurance shortfall is subject to debate, Congress, EPA, and the

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1/ 42 U.S.C. Section 9619.

4/ House Conference Report No. 99-962, 99th Cong. 2nd Sess. 237, reprinted in 1986 U.S. Code Cong. & Admin. News, 3276, 3330.

5/ Id.

6/ See 54 Fed. Reg. 46013, October 31, 1989.

7/ EPA OSWER Directive No. 9835.5.

8/ 54 Fed. Reg. 40612, October 31, 1989.

RAC industry all agree that indemnification remains necessary. It is an essential prerequisite for obtaining competent and cost effective response actions.

### E. CERCLA Section 119 Applies to RACs Working at DOE Facilities

The scope of CERCLA Section 119 as well as the CERCLA Federal facility provision at Section 120, confirm that relief from liability provided to RACs under Section 119 of CERCLA applies equally to RACs working at DOE facilities. Section 119(a) states that RACs will not be held strictly liable under Federal laws. No exception is made for federal facilities. Section 119(c) authorizes the President to indemnify RACs for negligence-based liabilities. Section 119(e)(1)(B) makes clear that "response action contract" includes "any ... contract ... with ... any Federal agency". CERCLA Section 120 confirms that every department of the United States government "shall be subject to, and comply with this Act in the same manner and to the same extent, both procedurally and substantively, as any nongovernmental entity." Accordingly, the DEAR should acknowledge that, for CERCLA related work, DOE's RACs and RAC subcontractors (a) have no federal strict liability for DOE work and (b) can and will be reimbursed (indemnified) for negligence-based liabilities associated with DOE work. This is the clear intention of Congress, as demonstrated by its enactment of Section 119.

### F. DOE Should Specify that RACs are not Covered by the Proposed Amendments to the DEAR

HWAC urges the Department of Energy to clarify its proposed regulations so that it is clear that RAC subcontracts are not covered, so that RAC costs and liabilities associated with the cleanup of DOE facilities remain reimbursable. DOE should state explicitly that DOE will continue to reimburse RACs for the cleanup of environmental problems of DOE facilities, including reimbursement in the event that RACs are later held liable, either strictly liable or for negligence, for remedial costs, natural resource damages, personal injuries, or property damages. RACs are hired to cleanup waste sites, not to join the ranks of the legally liable parties.

## II. CONTRACTUAL PROBLEMS IF RACS ARE COVERED BY THE DEAR AMENDMENTS

The application of the DEAR amendments to RACs would create numerous contractual problems that DOE apparently did not consider or intend. The problems arise primarily because (1) to date, DOE cleanups have been primarily conducted by RAC subcontractors that have no direct contractual relationship with DOE and (2) the proposed regulations have no guidance as to how the risk reallocation should occur in the subcontractor context. (In addition, there is no guidance in DOE's M&O subcontracting requirements at DEAR part 970.71.) RACs represent the high risk component of M&O subcontracts. Thus, RACs are vitally affected by DOE's proposal to shift risks to the M&Os (and, by implication, to their subcontractors). If, in spite of the good reasons set out herein to the contrary, DOE intends that these amendments are to apply to RAC subcontracts, it is critical that DOE provide substantial additional guidance in order to resolve a number of open issues. These include the following:

A. No Requirement for Flowdown of Increased Fees or Ceilings on Liability

There is no indication in the proposed DEAR amendments as to how the "sharing of risks and rewards" would flow down to RAC subcontractors. Under the proposed amendments, M&Os are to be accorded both a larger fee and a ceiling on their liability for the specified unallowable costs. However, there is no requirement that fee arrangements with RAC subcontractors similarly be commensurate with the risk involved in the work. Significantly, there is also no requirement that RAC subcontractors' potential financial risk be subject to a ceiling similar to that provided for M&Os. If the RAC's liability is subject to a ceiling, what is it? Is the ceiling the same total dollar amount for both the M&O and for each of its subcontractors or does some proportionally smaller amount apply to subcontractors? Will DOE permit the M&Os to flow all of the risks down to the RACs, without a sharing of the profits?

It has been the experience of many HWAC members who perform work for DOE's M&Os that RACs do not have equal bargaining power with M&Os regarding contract terms. Without a mandated ceiling on RAC exposure for financial risks due to the defined "avoidable costs," RAC subcontractors may well be subjected to intolerable levels of financial exposure.

B. How Clean-Up Work Is To Be Performed

The proposed amendments also fail to address some of the basic contract issues concerning RAC performance. The proposed amendments seem to contemplate only the use of cost-plus award fee contracts. However, it has been the experience of HWAC members (and other federal agencies such as EPA) that the form of RAC contracts will vary, depending on the type of work being performed. For example, a cost-plus fixed fee contract may be used for remedial design work, but actual implementation and construction may be accomplished on a fixed-price basis. Because fixed-price contracts shift substantially more risk to the contractor, HWAC suggests that DOE should clarify whether it means to exclude the use of fixed price subcontracts for clean-up work by M&Os. If it is not DOE's intent to exclude such subcontracts, how would DOE determine the limitation of liability, if any?

Further, some site investigation and remedial design work may be appropriate for architect/engineer-type contracts. Under a typical A/E contract, the contractor already is required to correct inadequate or deficient designs, drawings or specifications at no additional cost to the Government. Is it DOE's intention to shift additional financial exposure to A/E subcontractors?

Finally, it is not clear whether it is DOE's intention that RACs supervise, actual implementation of clean-up activities. If such work is to be required of RACs, how does DOE intend that liabilities for "avoidable costs" be apportioned between the various tiers of contractors from the M&O through the actual construction subcontractor?

C. Definition of Negligence

The proposed amendments expose M&Os and their subcontractors to financial risk for costs incurred due to "negligence" of contractor or subcontractor personnel in performing their work, including third party claims and associated litigation expenses. However, the proposed amendments do not explain how DOE will determine if "negligence" has occurred. The lack of a standard in

the proposal is particularly troubling in light of the fact that many claims are settled without a judicial determination being made as to the existence of "negligence." Is it DOE's intention that the M&O or DOE will make an independent determination of the amount of RAC costs that are attributable to "negligence" and therefore are "avoidable"? If so, what standards are be to applied? Further, what mechanism will be available to the RAC subcontractor in the event of a disagreement -- does DOE consider this to be an appropriate issue for the Board of Contract Appeals?

D. Guarantees

The proposed amendments require, in Section 970.5204-55(b), that the M&O provide a "guarantee" that it will have sufficient financial resources to cover all costs and liabilities up to the prescribed ceiling. Presuming that some equivalent requirement applies to RAC subcontractors, the requirement for a guarantee raises several questions. Is it DOE's intention that a bond be obtained? Further, the proposed amendments state no duration for the "guarantee." Is it DOE's intention that the "guarantee" extend indefinitely? What form will the "guarantee" take if a RAC is performing services at more than one site? Will DOE pay the costs associated with obtaining and maintaining a bond, particularly if the bond (or other arrangement) must be maintained for a substantial length of time?

E. Disputes

The proposed amendments are also not clear whether an avenue of appeal will be available for disputes over "avoidable costs." The typical award fee clause provides that determination of the fee cannot be challenged under the Disputes Clause. However, as here the award fee is used only to measure the ceiling amount of avoidable costs, then it would appear allowability determinations could properly be challenged under the Disputes Clause. HWAC assumes DOE did not intend to foreclose all appeals over allowable costs by its reference to the award fee.

F. Inability of Most Construction Subcontractors to Obtain Required Miller Act Performance Bonds

Under the Miller Act, 40 U.S.C. §270a, at seq., contractors performing construction services under Federal contracts are required to post a performance bond upon being awarded the contract. Without indemnity from catastrophic losses, sureties are currently unwilling to bond hazardous waste cleanup projects involving construction services. For example, the Corps of Engineers has experienced substantially increased costs for cleanup contracts because the responsive low bidder often cannot obtain a bond. Since only a few large and financially strong firms will be able to obtain bonds if the proposed amendments are applied to RAC subcontracts involving construction services, participation of small businesses in the cleanup program will be substantially reduced.

G. Creation of a DOE Program for Clean-Up of DOE Facilities

HWAC suggests that DOE may want to reconsider whether, despite the tradition of using M&Os to manage all work at DOE facilities, it is appropriate or desirable for M&Os to manage cleanups at these sites. DOE may be better served by taking a more direct and active role in creating a program for and contracting for response action cleanups at its facilities.

III. OTHER MISCELLANEOUS ISSUES

Although HWAC's comments are limited to those issues which are of particular concern to RACs, HWAC believes that the DOE proposal raises various broader problems. For example, it is difficult to understand how a rule which will have such important and disproportionate impacts on small businesses, such as RACs, can avoid the necessity of an analysis under the Regulatory Flexibility Act of 1980. Likewise, HWAC believes that the potentially enormous liabilities and costs "shifted" by the proposed regulation makes it a "major rule" requiring analysis under Executive Order 12291. Finally, DOE's proposal to disallow the costs of insurance (if it ever becomes available to RACs) for avoidable costs, seems to represent a particularly archaic viewpoint. For decades it has been normal commercial and governmental practice to recognize the validity and reimbursability of contractors' insurance costs.

IV. CONCLUSION

The proposed amendments to DOE's acquisition regulations should be revised to make clear that they do not apply to the contractors and subcontractors that perform environmental remedial actions for DOE. The proposed amendments are intended to reallocate the risks as between DOE and the M&Os, and do not appear to be intended to address RACs, the companies that clean up environmental problems. This should simply be made explicit.

Indeed, there are at least four important reasons why RACs should continue to be reimbursed and indemnified for the risks associated with their work in cleaning up DOE's hazardous waste sites. First, Congress has acknowledged the special problems and needs of RACs by enacting CERCLA Section 119. This immunizes RACs from federal strict liability and authorizes each agency to indemnify RACs for negligence-based liability. Second, EPA, in its October 1989 proposed guidance concerning the indemnification of RACs, has acknowledged that RACs are an essential component of this nation's hazardous waste site cleanup program and that insurance and other commercial risk allocation mechanisms are inadequate to protect RACs. Third, exposing RACs to greater financial risk will drive the best RACs away from DOE work, and will seriously undercut DOE's ability to obtain competent and cost effective environmental cleanups. Finally, applying the proposal to RACs creates many unanswered questions that will require substantial additional guidance from DOE.

Thank you for the opportunity to comment on the Department of Energy's proposed amendments to its acquisition regulations. If you have any questions or comments or require further information, please to not hesitate to contact Alex S. Karlin of Morgan, Lewis & Bockius (202-467-7158).

Sincerely,

George Gleason

George Gleason
Chairman, Hazardous Waste
Action Coalition

## "Appendix"

Attachment A: Qualitative and Quantitative Analysis of Risks Facing Engineering Firms

Attachment B: Synopsis of Claims Data and Cleanup Costs

Attachment C: Illustrative List of Third Party Claims Exceeding $50 Million

Attachment D: Illustrative List of Superfund Site Cleanup Costs

Attachment E: Synopsis of Lack of Pollution Liability Insurance

Attachment F: Will RACs Work Without Indemnification? ACEC Preliminary Survey

Attachment G: Evaluation of Recent Fixed Price Bids

**ATTACHMENT A**

**Qualitative and Quantitative Analysis of Risks Facing Engineering Firms**

**I. Technical Issues Increasing the Risk of Hazardous Waste Engineering**

A 1985 study by the American Bar Association's Public Contract Law Section concluded that the technical demands of hazardous waste cleanup presented much greater risks than the traditional assignments of architect and engineering firms:

> What must be emphasized at the outset is that the role of the A/E in the program and the exposure to liability is significantly greater than in the traditional planning, design, and construction inspection functions served by these professionals in other environmental programs. The different role is attributable in part to the fact that the investigative activities are themselves ultrahazardous; the potential impact of the wastes, if not properly removed, treated or stabilized is so significant that technical accuracy and completeness is absolutely required.1/

At least six technical or engineering factors distinguish hazardous waste engineering from a traditional engineering project, such as the design of a highway overpass.

**A. Absence of Widely Accepted Standards**

For all areas of traditional engineering, there are comprehensive sets of widely accepted standards of practice. Those standards are set by a number of highly regarded neutral organizations, such as the American Society of Testing and Materials, the American Water Works Association, and Underwriters Laboratories. Because of the relative newness of the hazardous waste problem, there is an absence of widely accepted standards of practice for hazardous waste work. There is also a lack of organizations to establish such standards. Without widely accepted standards, consultants may easily be second-guessed regarding the appropriateness of their decisions and recommendations.

**B. New Solutions and Technologies**

Most of the solutions and technologies for traditional engineering problems are well researched and time-tested. Even so-called "new" technologies for traditional engineering problems are more likely to be variations on older technologies or new applications of well understood physical principles.

In comparison, many of the solutions and technologies for hazardous waste problems are relatively new and largely untested. While they may appear adequate and cost-effective at present, if these technologies experience difficulties in the future, consultants could again be second-guessed regarding their decisions. This point was succinctly made in the ABA Public Contract Law Section study:

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1/ D. Anglehart and J. Thompson, Jr., The Architect/Engineer's Role Under Superfund, Public Contract Law Section/American Bar Association Monograph Series, at 3. [hereinafter ABA Study].

> Given the rapidly evolving nature of the "state of the art" engineering solutions to hazardous waste site cleanups, it can be expected that auditors or contracting officers will be using 20-20 hindsight in some instances to evaluate, after cleanup, technical proposals for the cleanup. The fact that most of these sites involve the containment or treatment of contaminated groundwater for which there can be no technical solutions makes it even more likely that disputes will arise.2/

C. Starting With a Pre-existing Problem

Most traditional engineering starts with a client desiring something that does not presently exist. In effect, the engineer is starting from a clean slate. In contrast, hazardous waste remediation work starts with a pre-existing problem: the mess left by a failure to apply adequate engineering in the first place.

D. Liquids in a Subsurface Environment

Most traditional engineering does not involve much subsurface work. Those areas of traditional engineering that do involve the subsurface environment generally involve solids such as foundations or pilings. In contrast, for most hazardous waste work, engineers are dealing with mobile liquids in an invisible underground environment. With even the most aggressive drilling and sampling protocols, the engineer is extrapolating from samples representing less than one-millionth of the volume in question.

E. Rapid Response Times

Most traditional engineering is not involved with emergencies. In contrast, many hazardous waste problems require rapid response due to the release or imminently threatened release of toxic materials. This decreases the time for research, data gathering, analysis and design that would normally be available on traditional engineering projects.

F. Influence by Outside Forces

Most traditional engineering is not controversial, and the engineer is left free to design solutions in accordance with his or her own best professional judgment. In contrast, hazardous waste sites are surrounded by controversy and by persons or entities seeking to influence the outcome of the engineer's work. Such forces include agency personnel, PRPs and their lawyers, news media, and property owners in close proximity to the site.

While these six technical or engineering issues make hazardous waste work difficult enough, they are probably dwarfed by the impact of toxic tort legal theories on the engineer's risk.

## II. Legal Theories and Litigation Realities

Failures of traditional engineering typically result in the following types of damages:

- Economic loss, such as the loss of use of a plant or process.

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2/ Id., at 35.

- o **Property damage, such as damage to adjacent objects following the collapse of a structure.**

- o **Personal injuries, but generally from physical impact (such as from a structural collapse or misdesign of a highway) or from fire or explosion.**

Hazardous waste introduces the problem of biological harm or disease into the equation and then confounds the problem with enormous, retroactively imposed legal liabilities that threaten to bankrupt any party contributing to the condition of a site. This section outlines eight ways the toxic tort system increases risk.

### A. Pre-existing Legal Liabilities

Hazardous waste sites are enormous pre-existing legal liabilities. Lawyers for all affected parties are usually already involved prior to the engineer's arrival on the site. Many of the owners or generators of the wastes are facing serious financial losses, and many will be bankrupted by the cleanup costs. Consulting engineers will be conspicuous targets in such an environment.

### B. Causation of Toxic Torts

Causation of biological harm or disease, particularly cancer, is far more speculative than causation of physical injuries involved in traditional engineering such as highway accidents or the collapse of structures. Biological harm is also far more terrifying to juries and less acceptable to the public than much higher risks such as automobile accidents.

Under traditional tort theories, the burden of proof of an injury falls on the plaintiff (victim), and proof requires a showing, by a preponderance of the evidence and to a reasonable medical certainty, that the conduct of the defendant proximately caused the plaintiff's disease or injury. Since cancer and most other biological problems can be caused by a number of different agents, or a combination of different agents, this burden of proof and standard of proof would appear to offer substantial protection to engineers working on hazardous sites.[1/]

The toxic tort system seems to respond to such difficulties for the plaintiff by relaxing traditional standards. The emerging standard of proof appears to be a showing that an exposure to toxic materials from one source was merely "a substantial factor" of the plaintiff's disease or injury, following which the burden shifts to the defendant to prove that the source did not cause the injury.[2/]

### C. Long Latency Periods

The biggest fear from toxic exposure is cancer or mutagenic or teratogenic effects. These will probably occur only

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1/ For a superb analysis of the legal and social policy issues associated with causation of biological harm and the current tort system, see Causation and Financial Compensation (1986) (published by The Institute for Health Policy Analysis, Georgetown Univ. Med. Center).

2/ See Elam v. Alcolac, Inc., Mo.S.Ct.No. 71296 (brief filed Jan. 23, 1989), reported at 3 TOXICS L. REP. (BNA 1108 (Feb. 15, 1989).

after the passage of substantial period of time, usually decades, and sometimes only after one or more new generations are born. These long latency periods, which a 1987 General Accounting Office study recognized as characteristic of pollution liability exposure, present the following problems:

- Since the harm will not manifest itself for many years, the parties potentially liable for causing the harm will not be warned or alter or adjust their techniques, standards or practices until after a substantial amount of work has already been performed. In engineering terms, the long latency periods effectively deprive engineers and society of a "feedback loop" on their conduct. By the time the harm is understood, a massive backlog of alleged harm has already been generated.

- Social views can change with time, such as the propensity of individuals to sue for specific harm or the propensity of jurors to find liability or to award large damages. Historically, those trends have all been towards an increase in the number and severity of toxic tort claims.5/

- As time passes and technologies change, society has a tendency to judge past actions in the light of superior current technology rather than the technology that existed at an earlier time.

- With the passage of substantial amounts of time, it becomes increasingly difficult for a party to demonstrate accurately what happened or what the standards of practice were years before. Where decades are involved, it is conceivable that the "experts" on the standard of practice at a toxic tort trial may not even have been born at the time that the work in question was actually performed.

D. Expansion of Bodily Injury Claim Theories

As noted above, because toxic torts are associated with biological harm and disease, the tendency has been to relax the rigid causation standard. But toxic torts have had another effect on bodily injury claims, namely to increase the types of claims recognized as compensable:

- "Fear of cancer" may now be a compensable harm.6/

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5/ An EPA staff study of liabilities associated with operation of hazardous waste facilities apparently this view: "Some plaintiffs attorneys active in hazardous waste litigation argue, however, that large action lawsuits involving numerous plaintiffs and very large claims can be expected in the future, and the limited data in our collection tends to bear out their prediction." U.S. EPA Internal Memorandum from Peter Linguiti et. al. to J. Anshetes Regarding Adequacy of Existing Liability Coverage and the Use of Variances and Adjustments.

6/ See Glucksterm, Cancer Fear Claims: Current National Judicial Trends, 3 TOXICS L. REP. (BNA) 947 (Jan. 4, 1989).

- "Future cancer" or "increased risk of cancer" may now be a compensable harm.[7] In such cases, medical experts testify that, although it is a medical certainty that the plaintiff doesn't have a disease now, it is a "reasonable medical certainty" that the plaintiff will have the disease in the future. Such damage theories simply beg for speculative medical testimony. Taken to the extreme, these theories lead to tautological absurdities such as the doctor who testified in an asbestos trial that, if the victim didn't die in the future of any other cause, the victim would die from his asbestos exposure.

- Expensive future, recurring medial examination costs have become a compensable harm. Sometimes such "surveillance" costs are virtually the only damages which can be proved.[8]

In contrast, imagine a court's likely reaction to a plaintiff seeking to recover for "fear of a bridge collapse" or for damages from a "future collapse" or for the ongoing costs of inspecting a nearby bridge because he feared it would someday collapse.

### E. Expensiveness of Property Damage Claims

If bodily injury claims under the toxic tort system have been "expansive," property damage claims should at least be characterized as "expensive." Three issues regarding property damage pose a special concern:

- Cost of cleanup: structural collapses or other traditional engineering failures tend to have quantifiable costs of cleanup. In contrast, an inadvertent release of toxic material that becomes airborne or waterborne may require cleanup over a vast area, even if only trace quantities of a harmful chemical have been deposited on adjacent land or property. Depending on administrative decisions about "how clean is clean," the cost of cleanup may be incalculably large.

- Diminution of property value: if a nearby structure has collapsed or is threatening to collapse, it is doubtful that the current tort system would allow nearby property owners to recover for diminution of their property values. In contrast, plaintiffs seek damages for diminution of property values in areas surrounding hazardous waste sites. Such damages are obviously extremely subjective and speculative not only in amount but also in duration.

- Environmental damage: if dust from a collapse or soot from a fire results from a traditional engineering failure, it is unlikely that any

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7/ Argued in Mauro v. Owens-Corning Fiberglas Corp. N.J.S.Ct. 29,005 (Feb. 15, 1989), reported at 3 TOXICS L. REP. (BNA) 1151 (Feb. 22, 1989).

8/ See Ayers v. Township of Jackson, 525 A.2d 287 (N.J. 1987); Willmore, In Fear of Cancerphobia, 3 TOXICS L. REP. (BNA) 559 (Sep. 28, 1988).

> engineer will be sued for "environmental damage." However, if an engineer fails to detect the presence of a pocket of chemicals underground at a site, and those chemicals subsequently leak trace amounts of toxic pollutants into a water supply, it is possible for the engineer to be sued not only for costs of removing the chemicals from the water but also for harm done to the "environment." Society simply has not established any form of rules or limitations on damages of this nature.

F. The Limit of Statutes of Limitation

Traditional engineering benefits both from statutes of limitation and statutes of repose. Most states have enacted statutes of repose which terminate claims against design professionals a fixed number of years from the time the engineering work is completed, regardless of whether an error or omission was known or could have been known by the injured party.[9/]

The benefit of state statutes of limitation or repose for engineers doing hazardous waste work may have been eliminated by federal law. SARA § 303 amended CERCLA by adding § 309,[10/] which requires that state statutes of limitation not start to run earlier than the "federally required commencement date," which is defined as:

> [T]he date the plaintiff knew (or reasonably should have known) that the personal injury or property damages . . . were caused or contributed to by the hazardous substance or pollutant or contaminant concerned.[11/]

G. Joint and Several Liability

Section 119 of SARA, as noted before,[12/] precluded imposition of strict liability on response action contractors. However, nothing in § 119, or anywhere else, expressly exempts response action contractors from joint and several liability once they have been found negligent, grossly negligent, or guilty of willful misconduct.

All of the problems of hazardous waste work created by the toxic tort system, as discussed in this section, are sharply magnified by joint and several liability. One of the characteristics of many if not a majority of hazardous waste sites is that they are "orphan sites," with no solvent PRPs available to pay for their costs of cleanup and any third party claims. Many of the sites that weren't orphans at the start of

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9/ For a listing of all state statutes of repose or limitation applicable to construction tort claims, see CONSTRUCTION RISK MANAGEMENT, sec. III, p. E.5. (1985) (published by International Risk Management Institute, Inc., 12222 Merit Dr., Ste. 1660, Dallas, TX 75251-2217, 214/960-7693).

10/ 42 U.S.C.A. § 9613, discussed in Relkin, New State and Federal Discovery Statutes of Limitation in Toxic Tort Litigation, 3 TOXICS L. REP. (BNA) 286 (July 27, 1988).

11/ 42 U.S.C.A. § 9613(b)(4)(A).

12/ Supra, note 7.

the Superfund process will be at its conclusion when the PRPs have been bankrupted by the costs of the Superfund cleanup.

The danger of orphan sites to the engineer is real and obvious. If an engineer commits the slightest act of negligence in the performance of the cleanup duties, the government and injured third parties may assert that the engineer has become jointly and severally liable for all future cleanup costs and damages, however remotely arising out of the negligence of the engineer.

When one combines the unique technical risks of hazardous waste engineering discussed in section B with the explosive growth in toxic tort damage and liability theories discussed in this section, the result is a situation of unparalleled risk and inequity for engineers.

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ATTACHMENT B

Synopsis of Claims Data and Cleanup Costs

The RAC industry is so new that it lacks a specific claims history, whether for cleanups on DOE facilities, private industrial sites, or orphaned waste sites. However, there is some limited information available regarding pollution liability claims, awards and judgments involving other parties, such as the owners and operators of waste sites. This data provides some idea of the potential magnitude of damages for which RACs could be held liable. For example, EPA's review of 66 specific pollution incidents involving third party liability actions revealed outstanding claims, awards or settlement amounts ranging from $3.3 billion (Love Canal) to $123,000 for a California smog award in 1986. Attachment C identifies a number of outstanding pollution liability claims that exceed $50 million.

RACs are also potentially liable for the cost of any cleanup that may be required due to the release of a hazardous waste caused by a remedial action. Through the Superfund program, EPA has developed a substantial data base regarding the actual or estimated cost of cleanup. Attachment D identifies a number of hazardous waste sites, where cleanup costs are estimated to range from $40 million at the Lipari Landfill in Mantua, New Jersey, to an estimated $2 billion at the Rocky Mountain Arsenal. Most of the current data is based on preliminary estimates that may be revised upwards if subsequent work reveals site conditions to be worse than anticipated.

With respect to the cost of a release occurring during cleanup, it may be impossible -- particularly if the claim arises years after completion of the remedy -- to separate the damage allegedly caused by the RAC from that resulting from site conditions as they existed prior to cleanup.

ATTACHMENT C

Illustrative List of
Third Party Claims Exceeding $50 Million[1]
(Ranked by Size of Claim)

| Dollar Amount | Date of Claim | Damage Type | Incident Reference | 1986 Value |
|---|---|---|---|---|
| $2.5 billion | Claim (1980) | Personal injury, property loss, income loss | Love Canal | $3.3 billion |
| $2.5 billion | Claim (1980) | Well contamination | Pesticides; Tennessee | $3.3 billion |
| $1.6 billion | Claim (1981) | Personal injury and porperty loss | PCBs; Alabama | $1.9 billion |
| $800 million | Claim (1980) | Personal injury; property damage | PCSs; Oklahoma | $1.06 billion |
| $500 million - $1 billion | Claim (1986) | Personal injury | Radioactivity; Missouri | $500 million - $1 billion |
| $200 million | Claim (1986) | Personal injury; property damage | Chemical wastes; Pennsylvania | $200 million |
| $157 million | Claim (1980) | Personal injury, income loss | Mobile; Alabama | $208 million |
| $100 million | Claim (1984) | Personal injury; property damage | Well contamination; Michigan | $110 million |
| $50 million | Claim (1985) | Personal injury; property damage | Dioxins; Arkansas | $50 million |

[1] Data from Environmental Law Reporter and other sources. Original citations available upon request.

ATTACHMENT D

Illustrative List of
Superfund Site Cleanup Costs[1]

| SITE | LOCATION | CLEANUP COST ($ Millions) |
|---|---|---|
| **Region I** | | |
| Baird & McGuire | Holbrook, MA | 44.4 |
| Re-Solve, Inc. | N. Dartmouth, MA | 40 |
| **Region II** | | |
| Bridgeport | Bridgeport, NJ | 57.7 |
| Combe Fill South | Chester, Township, NJ | 46.1 |
| Lipari Landfill | Mantua, NJ | 40 |
| Love Canal | Niagara Falls, NY | 250 |
| **Region V** | | |
| Metamora Landfill | Metamora, MI | 41.5 |
| Rose Twp. Dump | Rose Township, MI | 30-40 |
| Summit National | Deerfield, OH | 30-40 |
| **Region VI** | | |
| Bayou Bonfoucca | Slidell, LA | 59.6 |
| French Limited, Inc. | Crosby, TX | 47-120 |
| Royal Hardage Site | Crines, OK | 374 |
| Sand Springs | Tulsa County, OK | 45 |
| Sikes Disposal Pits | Crosby, TX | 102.2 |
| Texas Eastern Gas Pipeline Co. | Houston, TX | 400 |
| **Region VIII** | | |
| Rocky Mountain Arsenal | Adams County, CO | 2,000 |
| **Region IX** | | |
| Iron Mountain | Redding, CA | 68.1 |
| Operating Industries | Monterey Park, CA | "hundreds of millions" |
| Stringfellow | Glen Avon Heights, CA | 100-550 |

1 SOURCES: EPA's ROD Annual Report; Inside EPA's Superfund Report; and conversations with EPA personnel.

**ATTACHMENT E**

Synopsis of Lack of Pollution Liability Insurance

DOE should not assume that the marketplace, and/or normal insurance mechanisms, will operate to allocate the risks associated with hazardous waste cleanups on DOE facilities. Successive studies by the General Accounting Office since enactment of SARA have determined that insurance remains generally unavailable, and is unlikely to provide adequate coverage for RACs in the near future. The most recent GAO report in September of 1989 concluded:

> Pollution insurance for RAC risks continues to be scarce and limited in coverage . . . Most representatives of the commercial insurance industry see little or no likelihood of expansion in the availability of pollution insurance for response risks in the foreseeable future.[1]

Pollution liability insurance has remained scarce, according to the GAO, despite resurrection of the coverage for other high risk activities following the insurance industry's recovery from the recent hard market cycle.[2]

The limited amount of pollution insurance for RACs now on the market is expensive, with premiums averaging 3% to 6% cost of cleanup. The available coverage, which is limited to either $5 million per occurrence and in the aggregate, or $3 million per occurrence and $6 million in the aggregate, falls far short of covering contractors from potential third party liability. In addition, these insurance policies may contain various exclusions or limitations that make them next to worthless.

- Some available policies are site-specific, that is, they do not offer coverage for the multiple site remedial design and management contracts awarded by EPA to reduce the cost and increase the pace of cleanup;
- While studies by the GAO and other sources suggest that claims may be more likely to arise more than 10 years after cleanup, none of the available policies offer protection against this kind of long-term liability.
- Some of the policies also exclude coverage for "professional errors and omissions," which form the basis of many negligence actions bought against engineering firms.

In addition to the lack of insurance, Superfund construction contractors are increasingly unable to obtain the performance bonds required under the Miller Act, due to the surety bondholders' concern regarding their potential exposure to pollution liabilities.

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1 U.S. General Accounting Office, Superfund: Contractors are Being too Liberally Indemnified by the Government, GAO/RCED - 89-160 (1989), [hereinafter cited as 1989 GAO Report, at 30].

2 Id., at 1.

The General Accounting Office identified three factors inhibiting the development of pollution liability insurance for the Superfund program. First, RACs are viewed as particularly high risks, even within the pollution control industry:

> Because of the unknown nature of the risks found at Superfund sites, RACs are regarded as a high-risk segment of the market by the insurance industry. As such, insurance options and policy terms are likely to be more limited than those available to less risky segments of the pollution industry, such as waste transporters.[3]

Second, insurers allege that recent court decisions have expanded policy terms beyond their intended meaning, to make the insurer responsible for judgments the insurer could not otherwise afford.[4] Insurers argue that this unanticipated expansion of liability has made it difficult to offer even small amounts of coverage, since insurers cannot be certain that courts will adhere to expressed policy limits. Similarly, surety bondholders are concerned that courts may expand the scope of performance bonds beyond their traditional confines in order to find a source of funding to pay claims that would otherwise be uncompensated.

Finally, since hazardous waste cleanup is a relatively new undertaking, any liabilities derived from such work may not be manifest until long after it is substantially completed. As a result, the insurance industry lacks the kind of claims history it needs to project the probability and frequency of losses, and to adjust policy limits and premiums to either avoid certain losses or generate enough premium income to cover them.

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[3] 1989 GAO Report

[4] Letter Re: Proposed Section 119 Guidelines Federal Register Notice from James L. Kimble, Senior Counsel, American Insurance Association, to Robert Mason, Chairman, EPA Indemnity Task Force, (August 15, 1988), at 5.

ATTACHMENT F

WILL RACs WORK WITHOUT INDEMNIFICATION?
ACEC Preliminary Survey

I. Background

Responsible businesses generally seek insurance to protect themselves from potential liabilities prior to entering into contracts that entail a high degree of risk. Unfortunately, the small amounts of pollution liability insurance available now or likely to be available in the near future do not come close to offsetting risks associated with the cleanup of hazardous waste sites.

Recognizing this problem, Congress authorized EPA to provide indemnification to the extent that adequate insurance was not available to address reasonable, potential long-term liability. The evidence suggests that failure to exercise this authority to provide the protection that Congress intended would reduce contractor participation in the program, which would limit EPA's ability to obtain the highest quality work at the most reasonable price.

II. Scope of Survey

The American Consulting Engineers Council (ACEC) has completed a preliminary survey designed to provide data about how indemnification affects contractor participation in hazardous waste cleanup. In December of 1988, a questionnaire was sent to 14 member companies requesting indemnification information for those projects occurring after January 1, 1986.1/ Projects reflected in the survey range from preliminary assessments to remedial actions, include work for federal, state, local and private clients, and extend to areas outside the Superfund program (such as RCRA corrective actions and underground storage tank cleanup). ACEC plans to use its experience in this first round to prepare and conduct a more extensive survey providing detailed data, and covering additional projects and companies. In the meantime, the discussion below summarizes the results of the preliminary survey.

III. Survey Results

Ten of the fourteen firms contacted responded with information on 169 projects. The survey results reflect the following distribution of projects according to indemnification category:

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1/ The effort was limited to more recent projects to minimize the paperwork burden and encourage a timely response.

TABLE A

| | |
|---|---|
| No indemnification: | 37 |
| RAC to indemnify client: | 54 |
| Client to indemnify RAC: | 66 |
| Other: 2/ | 12 |
| TOTAL: | 169 |

Survey respondents reported receiving contracts and accepting work for 88 projects, deciding not to propose on 48 projects, and proposing but failing to agree on contract terms on 33 projects. The following discussion evaluates how the presence or absence of indemnity affected the willingness of contractors to propose or accept work. (Due to an overlap among categories, the totals discussed in each section will not add up to 169 projects).

RACs won proposals and subsequently negotiated a satisfactory contract for 88 of the 169 projects reflected in the survey. Of these 88, 63 required the client to indemnify the RAC. By client type, these 63 projects break down as follows: 49 private; 3 local government; 3 state government; and 8 federal government.

These contracts are characterized by a relatively high value, with over one half exceeding $200,000 and approxi- mately one-third exceeding $1 million. RACs accepted work for an additional 17 projects where the RAC was either not indemnified, or was required to indemnify the client. As is discussed below, the survey reveals that the latter projects are characterized by low dollar values or a low degree of risk. Table B below summarizes the indemnification terms for the 88 projects where work was accepted:

TABLE B

| Indemnification Terms | Number of Projects |
|---|---|
| Client indemnifies RAC | 63 |
| No indemnity | 7 |
| RAC indemnifies client | 10 |
| Other: | 8 |
| TOTAL: | 88 |

The following sections review those circumstances in which RACs were not offered indemnity, or were required to indemnify the client.

A. RACs unwilling to propose

Respondents reported that 91 projects offered no indemnity, or required the RAC to indemnify the client. In 45 cases, RACs simply did not submit proposals, even though some of these projects appeared to be preliminary assessments. The following comments were typical of the explanations offered for the decision not to propose:

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2/ These 12 projects required the client and RAC to indemnify each other, or included some other provision allocating liability between parties. Because these represent a small portion of responses and have unique characteristics, they are not discussed further in this summary.

- "It is not in the firm's interest to obtain projects without some form of indemnification -- too much risk."
- "We have turned down about ten projects of this type due to indemnification terms. We do not accept any property assessment work unless there are adequate indemnification terms."
- "Could not work out acceptable language in client's boiler-plate indemnification."
- "State had maximum indemnification of $1 million to be shared by 10 contractors. Company decided $1 million inadequate amount of protection for one contractor - let alone 10!"

B. RACs may propose but may be unable to accept work without indemnity.

In 29 cases, RACs submitted proposals but did not ultimately sign contracts due to an inability to reach agreement with the clients on terms. The following comments indicate that while companies may propose on projects for which indemnity is not offered, they may not proceed to contract if the client does not agree to provide such protection during subsequent negotiations:

- "We were selected for the job but their attorneys would not accept our indemnification clause. Regretfully, we declined the assignment."
- "Client came to us sole-source. We declined to perform work due to client unwillingness to indemnify us."
- "Declined to continue relationship, due to potential for unlimited, uninsured liability."
- "No indemnification -- we walked."
- "Walked from job, even though selected."

C. Where RACs accepted work without indemnity, dollar amounts or risks were low.

The seventeen projects where RACs accepted work without indemnity or were required to indemnify the client were typically contracts for preliminary assessments characterized by small dollar amounts. Respondents also sometimes commented that these projects involved low risks, noting, for example, that the work involved "no intrusion" or "no third-party risk" or offered, "well defined scope and liability exposure."

Of the seven projects accepted where no indemnity was offered, two were very small jobs for a private client, one was an extremely small regulatory compliance job for a local government, one was a small non-intrusive preliminary site assessment (PSA) for state government client, and one was a non-intrusive PSA for a Federal government client. The other two projects were accepted without indemnity only after careful assessment of site conditions (such as remoteness from populated areas) revealed that the limited scope of work would not expose RACs to significant liability.

Of the ten projects accepted where the member firm had to indemnify the client, nine jobs were for private clients and one was for a local government. Further breakdown of the category indicated that:

- On five of the survey forms, the RAC limited indemnification of the client to "the limits and coverages of insurance" carried by the RAC, while
- the other five jobs were all remedial investigations for private clients, and the average project size (fee) was under $50,000.

IV. Conclusion

The following conclusions may be drawn from the ACEC preliminary survey:

- RACs received indemnity for most of the projects where RACs won proposals and subsequently agreed to accept the work offered.
- RACs will often submit proposals for projects where indemnification is not offered in the hope the client will agree to provide such protection during subsequent contract negotiations. Upon failing to reach such an agreement with the client, the RAC will either refuse to accept work or be dropped from consideration.

The results reflect a limited sample, and ACEC plans to conduct a more comprehensive and sophisticated follow-up survey. However, the preliminary evidence suggests that the failure to offer indemnification will lead to a serious attrition of contractors from the nation's cleanup program.

ATTACHMENT G

EVALUATION OF RECENT FIXED PRICE BIDS

I. Summary

This attachment evaluates recent fixed price bids for remedial action projects let by the Corps of Engineers (Corps) and by the New Jersey Department of Environmental Protection (NJDEP). The Corps and NJDEP differ significantly in their handling of indemnification, with the Corps providing uncapped, SARA 119 indemnification and NJDEP penalizing bidders who request indemnification. The conclusions drawn from this evaluation are:

- o the net result of New Jersey's policy has been to provide no indemnification to remedial action contractors and to drive out those contractors requiring it;
- o New Jersey is receiving one-half the number of bids per project from one-third to one-fourth the number of companies bidding Corps work;
- o New Jersey is paying a premium of more than 20% of the project cost for its policy, compared to projects bid by the Corps;
- o There is already a scarcity of bidders bidding the larger Corps projects and applying the New Jersey policies would only aggravate the situation.

II. Introduction

Both the Corps of Engineers and the New Jersey Department of Environmental Protection manage remedial action projects under the Superfund program. The remedial action projects discussed here are handled as construction projects, with an Invitation for Bid (IFB) publicly announced and sent to all contractors who request it, followed by bids and an award to the low responsive, responsible bidder. Bid bonds are required with the bids and a 100% performance bond and payment bond are required of the unsuccessful bidder.

One significant difference in the process is the treatment of insurance and indemnification. The Corps routinely provides indemnification through the SARA par. 119 indemnification clause, the same one used by EPA in all of its contracts. This clause provides an uncapped indemnification covering a hazardous waste release caused by the negligence of the contractor. A $100,000 deductible per occurrence is required, and there is no time limit on the indemnification coverage. The clause allows the Corps to require the contractor to purchase pollution insurance after contract award at Corps discretion (at added cost). The Corps does not provide contractors any evaluation credit/debit due to the contractor providing pollution insurance or seeking the indemnification.

The NJDEP has offered up to a maximum of $10,000,000 of indemnification covering pollution claims with no deductible. Time limits for submittal of claims have ranged from two years to ten years. However, the NJDEP subtracts from the bid price for bid evaluation purposes if the contractor provides pollution insurance and adds to the bid price for bid evaluation purposes if they provide indemnification. An example of how this process works can be seen in the 8/89 Syncon Resins project bid managed by

NJDEP. The NJDEP requested that contractors provide pollution insurance in amounts up to $4 million and gave the contractors the option of requesting indemnification in amounts up to $4 million. The indemnification covered claims submitted up to two years after substantial completion of the work. Contractors could also request combinations of insurance and indemnification in total amounts not to exceed $4 million. The Government estimate for the Syncon Resins project was $16,000,000. The subtractions/additions were:

- $4,000,000 Insurance provided by contractor - subtract $825,000 or 5.2% from bid price for evaluation purposes;
- $4,000,000 Indemnification requested by contractor - add $927,000 or 5.8% to bid price for evaluation purposes.

Lesser subtractions/additions were provided for amounts less than $4,000,000. Other NJDEP bids have been handled in a similar manner with approximately a - 10% to + 10% spread in evaluated bid price due to the provision of insurance or request for indemnification in the amount of $10 million.

Note that NJDEP offered an indemnification on the Syncon Resins project that was nearly equivalent to the kind of claims-made insurance currently available. It is also worth noting that NJDEP's authorization to provide indemnification expired on December 31, 1989.

## III. Recent Bidding Results

Exhibit 1 provides data on recent Corps bids and Exhibit 2, data on NJDEP bids. The project names and locations are given, along with the bid dates, bidders, bid price and bonding requirements. For New Jersey, the pollution insurance provided by the contractor and the indemnification requested are also given. The bonding company is listed if available and the status of the award and comments are provided. Data was made available from the Corps on ten bids in the 1988-1989 time frame covering projects in the $4 to $50 million range. Data is shown on the two 1989 NJDEP projects that were bid (there was no data provided for 1988).

## IV. Evaluation of Recent Bids

One of the first conclusions that can be drawn is that the NJDEP bid policy is resulting in no indemnification being provided to any of their contractors (Exhibit 2). In fact, contractors are not requesting indemnification but are providing insurance, which is not surprising given the bid penalties associated with any other course of action. What has happened in New Jersey is that only those contractors who are willing to risk their assets to cover future pollution claims or who have few assets to risk are bidding New Jersey work, given the inadequacy of insurance to cover pollution claims as discussed in other sections of this submittal. Contractors unwilling to risk their assets are not bidding.

Exhibit 3 summarizes data on all corps and NJDEP contracts awarded in the $3 to $20 million range, while the Government estimate, number of bidders and whether or not indemnification was provided is shown along with a comparison of the bid prices as a percentage of the Government estimate. General conclusions which can be drawn from these data are:

1. Many more bidders are bidding individual Corps projects and many more companies are participating in Corps bids than on NJDEP projects or bids (including only responsive bidders). Summarizing the data:

| | Average No. of Bidders | No. of Companies Participating |
|---|---|---|
| Corps | 6 | 23 |
| NJDEP | 3 | 6 |

The Corps is getting twice as many bids as is NJDEP from a bidders' pool that is three to four time as large. The lower number of bidders in New Jersey is due to fewer firms being willing to risk their assets to work in the State and the general inadequacy of the $3 to $4 million of indemnification that is offered.

2. The Corps is receiving lower bids relative to the Government estimate than is NJDEP. In fact, the Corps is awarding contracts at an average of 77% of the Government estimate, while NJDEP is awarding contracts at 94% of the Government estimate. If the average of the first three bids is considered, the Corps number is 82% and NJDEP's, 112%. The NJDEP has received only one bid at or below the Government estimate for each project, whereas the Corps is generally receiving multiple bids below the Government estimate. These data indicate that New Jersey is paying a premium for work done in the State and, in fact, is paying in excess of 20% more for execution of its projects than is the Corps.

The premium being paid in New Jersey is not surprising since first, the insurance provided to the State by contractors represents a real cost of 3% to 6% of the bid price and will be included in the bid, and second, contractors are accepting more risk in New Jersey than on Corps contracts and will expect to be compensated for that risk. In addition, the lack of competition in New Jersey drives up bid prices and allows contractors to be paid up front to assume the added risk.

Another general conclusion that can be drawn from the Corps data on the largest projects (those larger than $20 million in Exhibit 1) is that the number of bidders per project falls off and there are fewer companies participating as the projects get larger. This is probably due to the limited number of companies currently willing to work on hazardous waste sites and the difficulty of obtaining the larger performance bonds. Given that there are already problems with getting enough contractors to bid this work, applying the New Jersey policies discussed earlier would only aggravate the situation.

## PRIOR CONSULTATION OF PROPOSED RULE-MAKING

Senator EXON. Thank you, Mr. Gleason. Gentlemen, your testimony has indicated very loud and clear the major concerns that you have with what is proposed by the Department of Energy. During the formulation of this proposed rule by the Department, there must have been some conversations back and forth between your organizations and the Department of Energy, or do I assume incorrectly, and the end result would be that this mandate from the Department of Energy came down without any input or advice whatsoever from you or your organizations?

Mr. PITTS. Mr. Chairman, we were informed verbally prior to the formal issuance of the proposed rule, and a meeting was held with the general counsel of the Department of Energy and a number of representatives of the contractors. At that time we indicated gener-

ally our concern. We had not seen the written proposed rule, it had not been issued yet, but the general counsel did go through the items and we told him of our concern. In addition to that, at least my company, based upon the information we got at that meeting, sent a letter both to the Admiral and to the general counsel stating our concerns, so they were aware of them prior to the issuance of the rule from our perspective.

Senator EXON. Then if I understand you correctly, you are saying that the Department of Energy formulated the proposed rule without consultation with you in the industry, and only after they had formulated the rule but before it was formally announced did they consult with you, is that right?

Mr. PITTS. Essentially, yes, Mr. Chairman.

Senator EXON. What about the rest of the members of the panel?

Dr. KERR. Mr. Chairman, the facts as we understand them are as you just heard. There was the meeting, we were represented, and we subsequently communicated both at that meeting and in writing our concerns with the proposed rule, at the same time supporting overall the objectives the Department had. We tried to point out in some detail the deficiencies as we saw them, but in fact it was done without the kind of interchange and discussion one would expect.

Senator EXON. Mr. Christesen and Mr. Gleason, do you have anything to add to that?

Mr. CHRISTESEN. Yes, Mr. Chairman, our company was not involved at all and was not aware at all that these rules were being promulgated until they landed on our desk in Washington. We had no opportunity to provide any input to these proposed rules.

Mr. GLEASON. It is the same in our case. I think because we are relatively new to the Department of Energy contracting operation, we were not invited. We had no previous knowledge of the rule.

### FAILURE TO COMPLY WITH ENVIROMENTAL LAWS

Senator EXON. Gentlemen, I am particularly concerned about the message presented by the reimbursement of fines and penalties brought about by failure to comply with the environmental laws. We have come to understand just in the last few years the serious problems, with lack of seemingly any environmental and safety considerations or concerns at all. This was the case in almost every Department of Energy facility that we looked at. I am not here to try to affix responsibility or blame today, but I am concerned about the fact that almost from the beginning the contractors were held harmless by the Government. I can maybe understand that this occurred at a time when it was deemed vitally important that we move ahead from a national security standpoint.

But once again, to use the words of one of the witnesses today, hindsight is always better than foresight, especially when you get down to the matter of trying to affix blame. I am not trying to blame anyone here today, but I am convinced that we have a sorry record indeed, and I suspect that all of us have to bear some of the responsibility for that. But the contractors had this almost carte blanche freedom from responsibility for their actions. Were it not for that carte blanche arrangement where the contractors were

protected, might we not have expected the private sector contractors to at least have paid more attention to the environmental concerns over the years?

Dr. KERR. Mr. Chairman, I think your concern is well expressed, and I think the most significant problem we face today is that we are, as one of the other witnesses stated, dealing with facilities that have been in existence for quite a long time, some of them built during the Second World War, others built shortly thereafter.

To give you an example of how our changing knowledge and sensitivities can affect one's view today, you may recall as I do many years ago that there was a common chemical used for dry cleaning called carbon tetrachloride. It also was used in fire extinguishers. It also was used in the manufacturing process in one of the Department of Energy manufacturing plants, and it is the major source of emission of hydrocarbons that today are found both to be in violation and a danger to people's health. The knowledge that there was that danger was something that evolved within the period that plant existed. And so part of the issue is this matter of changing sensitivity. We as contractors and as citizens are aware of our responsibilities and in no way want to be found in violation of the law or regulation.

On the other hand, we also have to have the support and knowledge so that the processes can be changed, and materials that are today found to be carcinogens and were not known to be 30 years ago, can be eliminated by a process of research and development, and we consequently can both be within the law. But more important, we will act responsibly as citizens for protecting the public health and safety. We do not need any negative incentives to do that; we need positive incentives. You succeed in these difficult and complex operations by leadership, not by penalties in my view.

Senator EXON. Then gentlemen, given the fact that I think you have stated it well, Dr. Kerr, carbon tetrachloride is just one that I remember from some time ago, at one time it was considered a very efficient cleaning agent for a whole series of purposes.

Dr. KERR. Yes.

### FUTURE ROLE OF CONTRACTORS

Senator EXON. But putting that aside for a moment, you all take serious exception to the proposed rule by the Department of Energy. Have you given any consideration as to what role the contractor can play in this in the future? Are you suggesting here today that we try and knock down the Department of Energy's initiative in this area? Have you addressed, individually or collectively, what you might do as contractors to accept some responsibility in this area or are you testifying today that if anything similar to the Department of Energy's suggested rules goes into force there is a high likelihood that you and organizations like yours might be required to withdraw from this business? Is there a happy medium or a meeting ground, or are you testifying today that we had best knock down the Department of Energy's rules or risk losing your expertise with regard to our nuclear programs now and in the future?

Mr. PITTS. I would like to try to answer that question, Mr. Chairman. I certainly agree with your initial concern about the situation. I think that as I indicated in my testimony, these sites are very old. My company has only become involved with the ones with the most serious problems relatively recently, that is, the past 4 or 5 years.

Our concern with the proposed rule in this area is that it lacks definition. Certainly my company and any company does not want to get involved with the mistakes of the past and have to assume the liability that was created in the past. I say a lack of definition because, if it were possible to define just what the problems of the past are and what the liabilities are, and if the Department of Energy could take the responsibility for those problems and resolve them—and they are trying to do that through the federal facility agreements—so that the States and the enforcement agencies know and agree to what is happening with respect to those problems. If we can get that defined and if we can get that responsibility assigned to the Department of Energy, then the idea of compliance from henceforward—because we are a private corporation and certainly we have the obligation to comply with the environmental laws, whether we are working for the Department of Energy or not—then I think with respect to our day-to-day activities, we would be able to consider the assumption of that kind of responsibility.

But until then, until we can get the problems of the past behind us and until we can avoid technical violations of the environmental law—because mixed wastes are sitting on those sites and there is no place to take them and the land ban rules are saying you cannot create any more because you cannot dispose of them on site—then we have this substantial problem with giving up the fines and penalties as an allowable expense.

DEFINITION OF FUTURE ASSUMED LIABILITY

Senator EXON. Are you saying, Mr. Pitts, that we might be able to work something out along the lines of the Department of Energy's suggestions if there was a hold harmless clause of some type for previous actions?

Mr. PITTS. I am saying that I think that is an area that can be negotiated with the Department of Energy and that if we were able to sit down and have a dialogue, a definition of the responsibilities could be put together and we could find an area where at least my company might consider potential liability, but not for the RCRA and CERCLA problems that were generated by the past.

Senator EXON. You are primarily concerned then about the past?

Mr. PITTS. That is right.

Senator EXON. Mr. Christesen and Mr. Gleason?

Mr. CHRISTESEN. Mr. Chairman, I think statements have been well made here as far as our position on these issues, but I would just like to elaborate on one other point. The proposed rules would enable the M&O contractor to simply take those liabilities, however they agree to take them, and just pass those down on to the subcontractors that may be working for them on those sites.

Speaking for our company, we are willing to assume liability, but we have to have that defined. We have to know what it is so we can make a business decision on whether we want to get into that contract or that business or not.

Once you assume liability we would like to see, given the conditions that have been described here, some form of a cap where, working with the Department of Energy and the M&O contractor, there is a complete understanding by all parties as to what is the problem that exists and how are we going to go about jointly to handle that situation.

Mr. GLEASON. Mr. Chairman, from the point of view of the clean-up firms who arrive on the site after the problem has been created and whose sole purpose in life is to clean that problem up, it is not clear to us under the Department of Energy rule that we are exempted from these past liabilities. We are concerned that by arriving on the site we accumulate all of this 40 years worth of baggage and indeed there is some basis in the rule and in other law to suggest that we would, and that represents a big problem for us. That is the past problem. The future problem is that once we arrive on the site, we are subjected to liabilities simply by being on the site for future activities of others as well as ourselves, and the engineering firms that we represent are people rich and asset poor. We work on professional fees and we cannot build into our fee structure sufficient profit in order to take account of these uncertain future liabilities.

So what we see as a need for clarity in the Department of Energy rule first with respect to the type of liability—we are willing to assume liability for our own negligence. Indeed, that is the standard which Congress has legislated in the Superfund law, and it is the one that we are used to operating under when we work for the Environmental Protection Agency for example. But the problem is that of the numerous sites, Department of Energy sites and Department of Defense sites, several thousand sites, there are only about 40 of them that come within the Superfund law, and when we operate under Superfund we are subject to these more rational rules. When we operate at the several thousand other sites, we do not know what the rules are today. There clearly is a need to go back to the Department of Energy and negotiate some more reasonable approach to this.

Senator EXON. To use an old phrase there, Mr. Gleason, I guess what you are saying is, "don't shoot the messenger." You arrived on the scene after the act, is that correct?

Mr. GLEASON. That is right.

Senator EXON. Thank you very much. Senator Bingaman.

### ROLE OF DEPARTMENT OF DEFENSE

Senator BINGAMAN. Let me ask any of you, how does the Department of Defense deal with this situation?

Mr. GLEASON. Well, our firms, Mr. Chairman, have just a little bit of experience with the Department of Defense and what we are seeing there is an entirely different regime than that which exists at the Environmental Protection Agency or the Department of Energy because the Department has so many arms and tentacles

and they do not yet have in place an overall environmental plan and policy, which they are in the process of doing now. It is left largely up to the individual services and there is a wide disparity among the individual services as to how they treat these problems. Some treat them with a great sensitivity to these special liabilities and some, like the Department of Energy, have not yet recognized those sensitivities. So we do not really think at this point, since the Department of Defense is in an emerging mode here, that they provide a model for the Department of Energy at this point.

Senator BINGAMAN. Are you saying the Department of Defense has no policy at the Department level as to what liabilities contractors will be held accountable for and what they will not and these kinds of issues?

Mr. GLEASON. Precisely, they are in the process of generating that type of overall departmental policy but they do not yet have it. And as a result, the individual services follow a variety of practices.

### NEGLIGENCE ACCOUNTABILITY

Senator BINGAMAN. Mr. Gleason has said that the companies that he represents have no problem with being held accountable for their own negligence. Am I understanding, Dr. Kerr and Mr. Pitts, that you are objecting to that, being held accountable for your own negligence?

Dr. KERR. Not at all. We expect to be held accountable for our own negligence, for either civil or criminal violations of the law, and have never objected to that. It is the issues of this proposed rule as stated that we objected to.

### ASSUMPTION OF RESPONSIBILITY AND LIABILITY

Senator BINGAMAN. The statement in this preamble to the rule which I have here says, "the rule-making proceeds from the premise that M&O contractors should be at risk for costs that they are in the best position to avoid. At present, however, virtually all M&O contractor costs are reimbursed by the Department of Energy regardless of the circumstances under which they are incurred."

First, let me ask the second part of that. Are you in agreement that the present arrangements that you have with the Department of Energy do result in your firms being reimbursed by the Department of Energy regardless of the circumstances under which costs are incurred? Is that a legitimate concern of Secretary Watkins and the Department of Energy at this time?

Mr. PITTS. I do not think you can simplify it by saying a contractor should accept the liability for its ordinary negligence because of the many facets of the situation at these sites, and because the contractor is not in total control of the site.

The Department of Energy compared the situation to asking the contractor to assume the same kind of responsibility it would at a commercial site that it owns. Well, there is a great difference between a Department of Energy site and the contractor-owned site, because the contractor is in full control of its own site, whereas at the Department of Energy facilities, the Department of Energy is making the day-to-day decisions.

The contractor is not in the position to provide the funding that it feels is appropriate for the site, and the Department of Energy does not really have as much control because of Congress. At its own commercial sites, the contractor can close a site and move off of it and start over again, still retaining responsibility for the environmental problems, but can close it. It cannot do that with respect to a Department of Energy facility.

The contractor can hire and fire the employees at will if they are not doing necessarily a very good job. It cannot do that in a Department of Energy facility. The contractor can hire subcontractors that it feels are best qualified to do the job. With respect to a Department of Energy facility, the Federal norm puts restrictions on a contractor's ability to select its preferred contractors.

So just to say that certainly we are willing to assume the responsibility for our own negligence is not that easy. If we were in total control of our own future, we certainly would be willing to do that and have to, but in this situation I do not think that that is possible. I think that the way it is set up right now, with respect to the standard of gross negligence and willful misconduct, is still a very appropriate approach to the situation.

ROLE OF INCENTIVES

Senator BINGAMAN. The way it is set up right now, do you believe that there are incentives? I mean, the whole idea behind this as I understand it was that the Department and the Secretary felt that there were not incentives in the present arrangement that the Department of Energy had with its contractors, incentives for the contractors to perform at the level of technical excellence that they wanted contractors to perform. Do you believe that is wrong? Do you believe those incentives exist in the present arrangement?

Mr. PITTS. I definitely do.

Senator BINGAMAN. What are those incentives?

Mr. PITTS. The incentive is that I work for the Westinghouse Electric Corporation that is a public company that has obligations to its stockholders and to the public and we have obligations under the laws that are already in existence. And we have incentives because we are a technically-oriented company and we want to continue that as a technically superlative company. So to incentivize us by penalizing us, I do not think is an incentive.

Senator BINGAMAN. Do you think that the incentive of maintaining your good name in the corporate community, which is essentially what you have described, that you are proud of the work that you do and want to maintain that reputation and that is adequate incentive? Is that what I understand?

Mr. PITTS. I think that is one of the incentives. I think there are others, like having the obligation to comply with the law, both environmental and——

Senator BINGAMAN. Should there be monetary incentives, which are part of what is in this rule as I understand it?

Mr. PITTS. Well, I think that certainly everybody is pleased by monetary incentives. I have yet to see the monetary incentives that they are talking about. They have just recently issued a new fee

rule which we are just getting—it is to be published today. So I am not really in a position to make that evaluation.

UNIFORMITY BETWEEN AGENCIES

Senator BINGAMAN. Is it fair to say that whatever we do or whatever the Department of Energy does in this area ought to be essentially looked at from the perspective of these other agencies as well? Is there a reason why the Department of Energy ought to have one set of arrangements with contractors such as yourselves, and the Department of Defense have another set of arrangements or another general framework for arrangements, and the Environmental Protection Agency have another general framework for arrangements?

Dr. KERR. No, I think in fact some uniformity of consideration for equivalent situations is an important step. The one significant difference is that the Government-owned contractor-operated facilities of the Department of Energy are rather special in this country and there are not a lot of similar situations overseen by other agencies in quite the same way. In particular, the fact that the Department of Energy's predecessor agencies choose to contract for the technical management and operations, to a much greater degree than any other government agency, does make them a bit different.

Senator BINGAMAN. All right. My time is up, thank you.

Mr. GLEASON. Senator, if I could just add from the point of view of the clean-up contractors, we do make the statement in our testimony that there is a need for uniform rules. It is the same group of companies that clean up the Superfund sites that clean up the sites for the corps, the Department of Defense, and there is a need for a unified rule.

Senator BINGAMAN. Is it fair to say that many of the companies that are affected by this rule are also the companies that are part of your group that does the work on Environmental Protection Agency Superfund sites?

Mr. GLEASON. Well, you have the Department of Energy and you have the M&O contractors and then under the M&Os you have all sorts of subcontractors. Our group is one set of subcontractors that specializes in the clean-up. And with respect to the clean-up, which is a major part of their ongoing program, it is clear that the same companies operate among various agencies and their work would be facilitated by some uniform understanding as to the responsibilities and obligations.

Senator BINGAMAN. Which agency should take the lead or have the responsibility to bring about that uniform policy?

Mr. GLEASON. I think that it has to be Congress because there are so many different——

Senator BINGAMAN. We are not an agency yet, I mean we may act like it. [Laughter.]

Mr. GLEASON. I understood that, but I really think that Congress has to set the basic policy which the agencies will follow. Clearly, there are differences from agency to agency that are going to have to be reflected in agency-specific rules. Congress has already addressed the fundamental policy in the Superfund law. It is already

addressed to some extent in the RCRA law. Now as we get into the market, the problem shifts from the Environmental Protection Agency Superfund to the Department of Energy to the Department of Defense, Congress has to let us know what the rules are going to be in those areas.

Senator BINGAMAN. Thank you, Mr. Chairman.

Senator EXON. Senator Bingaman, thank you very much. Gentlemen, you notice that we perk up a little bit when anybody refers to us as being an agency. An agency is only a step away from the bureaucracy. [Laughter.]

Senator EXON. And we reserve the right to beat up on the bureaucracy and the agencies. [Laughter.]

Mr. GLEASON. We understand that Congress is part of the solution, not part of the problem. [Laughter.]

Senator EXON. We will not take a vote on that today. [Laughter.]

### DISCUSSIONS BETWEEN THE DEPARTMENT OF ENERGY AND CONTRACTORS

Senator EXON. A vote just started on the floor of the Senate that we will have to leave for. I just have one last question for this panel, while advising you that there will be additional questions that we will submit to you for the record, and we would hope that in as prompt a fashion as possible you would be able to respond because I think you sense the urgency and the deep concern that those of us on the committee have in this regard and have held for a long time. Obviously something is going to be done about this problem, some changes are going to be made. In your discussions, individually and/or collectively, with the Department of Energy, has there been any indication on their part that some kind of compromise might be worked out with regard to some of the things that we have discussed—for instance, a hold-harmless clause of some type?

Dr. KERR. Since we responded to the notice of proposed rulemaking, Mr. Chairman, with our written comments, we have had no further discussion either at our initiative or the Department's on this matter.

Senator EXON. Then I understand that from your perspective, at least at the present time, the Department of Energy seemingly is holding firm that its proposal is a sound one?

Dr. KERR. That appears to be the case, sir.

Mr. CHRISTESEN. That is the way it appears.

Mr. PITTS. We have had some limited discussion, and I think the Department of Energy is continuing its consideration of the situation. We, at the outset and in our comments, suggested that the Department consider sitting down with the contractors before it makes the rule final and try to negotiate with respect to specific provisions and try to work out an alternative. We suggested that before they issued the rule for comment, and I think it fell on deaf ears. Hopefully now they will reconsider.

Senator BINGAMAN. Mr. Christesen and Mr. Gleason, anything to add?

Mr. GLEASON. Mr. Chairman, the pile of comments that was submitted to the Department of Energy is about that high, and I have

read all of them. I do not believe that the Department of Energy could responsibly go forward without making changes in this rule in view of the serious fundamental problems that have been addressed in those comments. While I do not know what they are doing, I hope that they are responding to them.

In our comment we suggested that one alternative is a negotiated rule-making. It is a process—it is not a new process. It is a process that other agencies use in a number of cases, and certainly, where you are addressing fundamental policy issues as they are addressed in this rule, it would be appropriate for the Department of Energy to follow some type of an approach like that.

Mr. CHRISTESEN. Mr. Chairman, we have responded with our position on a number of issues on this proposed rule. We look forward to the opportunity to provide some feedback and discussion in coming up with a much better program for both the Department of Energy and the contractor community.

Senator EXON. Gentlemen, thank you very much. I would emphasize again, there are going to be some questions for the record. We will now recess temporarily and excuse this panel, and when we return with the second panel, Senator Bingaman will be chairing and we will have a follow-on discussion with the second panel. With that, we are in temporary recess.

[Recess.]

Senator BINGAMAN [presiding]. We will reconvene the subcommittees and go ahead with the second panel. I am informed that the order we should proceed in is Al Narath from Sandia National Laboratories first, John Nuckolls from Lawrence Livermore second, and Sig Hecker from Los Alamos third. We are very pleased to have all of you here and look forward to your testimony. If you would summarize your testimony, we will of course include your complete statement in the record. Then I will have a few questions.

## STATEMENT OF AL NARATH, PRESIDENT, SANDIA NATIONAL LABORATORIES

Dr. NARATH. Thank you, Mr. Chairman. I would like to thank you in particular for giving me this opportunity to speak this day. I am Al Narath, President of Sandia Labs.

As you well know, Sandia has been operated by AT&T since 1949, following a request by President Truman which challenged AT&T to apply best industrial management practices to the execution of a new vital national initiative. AT&T has done this job since 1949 on a no-fee, no-profit basis. Now today, as in the past, AT&T's motivation for managing Sandia is public service, plain and simple, as well as a conviction that Bell Laboratories continues to be the appropriate model for Sandia.

Not coincidentally, we have adopted the Bell Laboratories operating style in regard to mission focus and the manner in which we achieve the integration of scientific creativity and engineering innovation to yield comprehensive solutions to technically challenging problems. Like Bell Laboratories, our strength and effectiveness are tightly linked to our technology base, which we believe stands second to none among government R&D facilities.

Since our founding, we have been an integral part of the nuclear weapons program, providing total concept to retirement engineering for every warhead and every bomb in the nuclear weapons stockpile. Over the years, the lab's specialized scientific and engineering skills and facilities have also contributed in significant measure in the solution to other problems in defense, energy, and other areas of national importance. We take great pride in our record of accomplishment as one of the Department of Energy's largest multi-program labs. As we enter the last decade of the century, Sandia's research, development, and systems integration capabilities are positioned to continue a 40-year history of significant service to the Nation.

But the world is changing today at an astounding rate, and national priorities are shifting rapidly. As superpower tensions ease, the Nation debates the magnitude and disposition of the possible peace dividend. Simultaneously, the reality of global economic competition is coming into sharper focus, and the continued erosion of U.S. economic performance has become a critical national security issue. At the same time, the American public has significantly raised its expectations for performance in Federal programs, including the demand for near-zero risk to environment, safety, and health.

At Sandia we recognize that our future effectiveness, perhaps even our continued existence as a major laboratory, will hinge on our ability to adapt to an operating environment which has suddenly become much more demanding. Stated differently, I believe we must change as well. The laboratory recently completed a comprehensive strategic planning initiative which included a very thorough assessment of our strengths and weaknesses and the needs of our sponsors. The strategic objectives which emerged from this exercise can be divided into four principal thrusts. I would like to summarize these as quickly as I can.

Number one is support of the Department of Energy. We have committed ourselves to reinforcing our historic partnership with the Department of Energy by dedicating maximum effort to helping the Department achieve its objectives across the board, including the achievement of full compliance with all environmental, safety, and health requirements. Incidently, in regard to the ES&H performance issue, I recognize that the potential cost of achieving and maintaining compliance could become unacceptably high. For that and other sound reasons, I believe it is essential that the labs realize substantial cost savings in all of their operations.

Number two is total quality. Following the lead taken by major U.S. industrial R&D organizations, such as Motorola, Xerox, and AT&T, we are instituting modern total quality management practices including the more effective utilization of our human resources, with a goal of becoming a far more productive, performance-oriented laboratory. We are applying quality methodologies to technical as well as administrative functions, including ES&H management processes. And let me say that in this effort we are being assisted in a significant way by our association with AT&T Bell Laboratories, an organization which you know has had to make difficult adjustments of its own in recent years in adapting to a more competitive environment.

Number three is weapons for a peacetime stockpile. I believe that the responsibilities and challenges associated with the maintenance of our nuclear weapons stockpile, regardless of its size, will continue to be formidable.

We intend to place increased emphasis on achieving cost effective solutions to near-term requirements and on an accelerated pace of innovation in areas which are judged to have the greatest potential for significant long-term impact. Our efforts will be guided by the realization that a stockpile designed for peacetime must increasingly stress safety, security, command and control, reliability over an extended stockpile life, and broad mission applicability.

I anticipate that continuing rapid advances in technology worldwide will not only offer opportunities for weapons improvements but will also drive the continuing need for modernization in order to avoid future maintenance difficulties resulting from sunset technologies. We believe that through greater emphasis on streamlined quality processes, standardization of parts, reuse of proven designs that are consistent with required functionality, and simplification of the requirements, a more cost-effective approach to maintenance of the peacetime stockpile is possible. Success in this approach will require not only improved integration of research, development, and manufacturing functions, but also a closer working relationship, I believe, with U.S. industry in supporting, augmenting, and adapting new technologies emerging in the commercial world.

But there are other needs as well. For example, with a strategic arms reduction agreement under negotiation, technologies to verify compliance have acquired new urgency. We have supported every arms control negotiation since the Limited Test Ban Treaty and have helped develop key technologies for the nonproliferation treaty and current START and nuclear testing negotiations. Our verification technology and related intelligence programs currently constitute about 12 percent of our work. This work is funded by the Department of Energy and other agencies and represents the largest aggregation of verification technology work at any facility in the world.

Number four is solutions to problems of national importance. Sandia will seek opportunities to expand its technical contributions in other areas affecting national security. I think it is time to admit to ourselves that our national security in its broadest interpretation is facing serious challenges from many different quarters. Our Nation's failure to have achieved energy independence, our loss of preeminence in manufacturing technology, and our mediocre performance in educating our youth are examples of weakness that cause concern.

At Sandia we intend to anticipate national needs and explore integrated solutions to problems in these and other areas. In this endeavor, we are building on our established technical strength as a way to maximize the return on Federal investments in Sandia's staff and facilities. You will recall that the weapons program alone has for some time been unable to support the full array of talents and capabilities needed for effective execution of our RD&T program. A diversified customer base, including, in substantial measure reimbursable programs for the Department of Defense and

other Federal agencies, has helped Sandia's ability to accomplish its nuclear weapons mission.

An overarching goal of all of our programs will be to maximize opportunities for contributing directly to U.S. national economic competitiveness, and we intend to accomplish this goal by maximizing our interactions with U.S. industry consistent with longstanding principles of fairness of access, avoidance of conflict of interest, and noninterference with the dynamics of the competitive marketplace. I believe that the nuclear weapons laboratories are in an especially strong position to help industry at this time. Indeed, Sandia has been working with industry for years in the weapons program, in energy, and elsewhere.

Beginning in the early 1970s we initiated substantial efforts in combustion research; solar, thermal, photovoltaic, and wind system developments; advanced drilling technology; and other energy-related activities. Every case involved extensive cooperation with industry groups, and many successful technology transfers were accomplished with significant economic impact.

Turning to the weapons program, here too we have supported close interactions with industry in the design and manufacture of non-nuclear components for nuclear weapons. Laboratory work at Sandia is not an isolated activity. In fact, many of the technologies and components developed for nuclear weapons applications have been transferred to the industrial sector for other applications, such as conventional weapons.

For example, Sandia's all-electronic safing and arming and fusing technology is being considered for application in the Patriot, the AMRAAM, and the Navy's advanced bomb family. Sandia's involvement in conventional weapons technology, broadly defined, constitutes about 4 to 5 percent of our work. In every case, we see our role as demonstrating prototypes of lower-cost versions of nuclear weapons technologies, followed by transfer to industry for production engineering and manufacture.

The point I want to make here is that interactions in our direct funded work over the years which have benefitted industry have had a scope that has not been commonly appreciated. In recent times we have actively pursued new ways of identifying, demonstrating, and transferring commercial valuable technology to the private sector. We have come to the important conclusion that the most effective approach involves close cooperation with industrial consortia. Such arrangements permit the laboratories to address not only long-range industrial interests, but relatively near-term objectives as well. We are thus able to impact the international competitive strength of the member companies directly, without significant danger of moving beyond the limits set by pre-competitive R&D.

We are proceeding with a cooperative program with SEMATECH to improve semiconductor fabrication equipment manufactured in the U.S. Importantly, our ability to enter into cooperative agreements with industry has been greatly strengthened by the passage of the National Competitiveness Technology Transfer Act of 1989. As a result we expect our technology transfer activities to grow substantially. Next month for example we will formalize an agreement to work with a consortium of U.S. special metals companies

to improve process control for production of high-performance alloys. Within only a few months of passage of this historic legislation we are actively pursuing almost two dozen such arrangements.

Incidently, the added cost to our program of these new technology transfer efforts amounts to about $16 million, of which the Department of Energy provides $5 million, with the remainder coming from industrial companies.

Before closing, I would like to return to the issue of the relationship between the laboratories and the Department of Energy. It is important to understand that from the beginning we have viewed our relationship with the Government to be a partnership based on shared values and mutual trust. I firmly believe that the technical successes of the nuclear weapons program can be attributed in large part to this special GOCO relationship as practiced by the Department of Energy's Office of Military Applications.

Under the arrangement conceived early in the history of the program, the Government provides broad programmatic and policy guidance. The laboratories take initiative in developing technical options and subsequently accomplishing specific weapons systems developments, consistent with requirements defined by policy and military decision-makers. In keeping with this approach, Sandia and its two sister weapons laboratories have traditionally been delegated significant flexibility in the allocation of their level of effort resources among a broad spectrum of R&D efforts, all aimed at achieving a stockpile that meets the U.S. national security needs.

I cannot over-emphasize the importance of vertically integrating the various elements of this development cycle. Consider this: our Nation's eroding economic competitiveness is demonstrating that neither scientific nor technological excellence automatically produces a differentiating advantage in global markets.

The U.S. excels both in science and technology. It is only when fundamental knowledge, technological innovation, and design and manufacturing are linked in an interactive, unbroken process that a nation realizes a competitive advantage from its scientific enterprise.

I believe our Nation must become much more effective at practicing such integration. The early architects of the Department of Energy's nuclear weapons program understood this necessity and had the wisdom to create an integrated environment within its laboratories and manufacturing plants. I believe that today the benefits of such an arrangement can extend far beyond its original purpose. Linked more closely to commercial enterprises, the weapons laboratories are capable of impacting U.S. economic competitiveness in ways that a fragmented approach to government R&D support cannot. In my view, the integrated strategy for the weapons program continues to be in the Nation's best interests.

Allow me quickly to suggest that the way to preserve the essential strength of the laboratories is to agree on the following two-part bargain. The laboratories should respond to the challenge of these difficult times by instituting improvements in their operating efficiency, with greater emphasis on mission focus and customer satisfaction, and manage their resources to achieve maximum real impact on national competitiveness, consistent with their other programmatic responsibilities. The Department of Energy, for its

part, should articulate clear, stable requirements for performance and deliverables and empower the laboratories to manage their resources and technical abilities to best achieve these ends. Finally, it is most important that this bargain be sealed with a commitment to maintain an adequate level of RD&T at the laboratories.

Unfortunately, our vital capabilities face severe threats during this period of declining support for the technology base upon which all of our activities depend. Over the last 5 years, under the pressure of declining real support for the weapons program, coupled with increasing requirements for production and environmental restoration and waste management, Sandia's forward-looking research and technology development has declined drastically.

The foundation of many of our contributions to safer weapons, arms control verification technology, safeguards and security systems, cleaner manufacturing methods, waste-handling techniques, and so forth derive from this fundamental base of advanced technical capabilities; yet that base has eroded in purchasing power by 30 percent since 1988.

The rate of technological advances around the world is extremely fast. If Sandia and its sister laboratories are to play the major role in U.S. economic development that I think we are capable of, then we must keep pace. If the financial support continues the downward trend of recent years, however, even the best management practices will not realize our full potential.

I well recognize that Federal budget problems are causing hardships in many sectors of our society. However, now is the time to close ranks, protect our proven national technical resources to the maximum extent possible, and permit and encourage them to address national strategic objectives in a cooperative and nonadversarial manner.

I want to assure you that Sandia is well on its way toward instituting needed internal redirections. AT&T, for its part, has continued its stewardship responsibility for the laboratories despite the substantial risk to its business interest which association with the nuclear weapons program entails. Please believe me that the potential for damage to corporation reputation is unfortunately very high these days, even with the best management practices. But despite the bottom-line realities of American enterprise, patriotism is not dead. It simply cannot be purchased.

Service in the national interest can still be satisfying and exciting, both for the contractor managers of the national laboratories and for the thousands of men and women who are dedicating their careers to this ideal. Thank you, Mr. Chairman.

[The prepared statement of Dr. Narath follows:]

## Statement by

## Al Narath, President
## Sandia National Laboratories

Chairman Exon, distinguished members of the committee, thank you for this opportunity to speak with you. I am Al Narath, president of Sandia National Laboratories.

As you know, Sandia is a government-owned, contractor-operated national laboratory that has been operated by AT&T on a no-profit, no-fee basis since it was requested in 1949 by President Truman to apply the best industrial management practices to the execution of a vital national initiative. Since our founding, we have been an integral part of the nuclear weapons program providing total concept-to-retirement engineering for every warhead and bomb in the nuclear-weapons stockpile. Today, as in the past, AT&T's motivation for managing Sandia is public service, and the conviction that Bell Laboratories continues to be the appropriate model for Sandia. Not coincidentally, we have adopted the Bell Laboratories operating style in regard to mission focus and the manner in which we achieve the integration of scientific creativity and engineering innovation to yield comprehensive solutions to technically challenging problems. Like Bell Laboratories, our strength and effectiveness are tightly linked to our technology base which stands second to none among government R&D facilities in terms of scope and depth. Over the years, the specialized skills, experience and facilities which make up this technical foundation have benefited not only the nuclear-weapons program; they have also contributed in significant measure to the solution of other problems in defense, energy, and other areas of national importance. In short, we take great pride in our record of accomplishment as one of DOE's largest multiprogram laboratories. As we enter the last decade of the century, Sandia's research, development, and systems integration capabilities are positioned to continue a 40-year tradition of service to the nation.

But the world is changing at an astounding rate, and national priorities are shifting rapidly. As superpower tensions ease, the nation debates the magnitude and disposition of a possible "peace dividend." Simultaneously, the reality of global economic competition is coming into sharper focus, and the continued erosion in U.S. economic performance has become a critical national security issue. And the American public has significantly raised its expectations for performance in federal programs, including the demand for near-zero risk to environment, safety, and health.

At Sandia, we recognize that our future effectiveness, perhaps even our continued existence as a major laboratory, will hinge on our ability to adapt to an operating environment that has suddenly become much more demanding. Stated differently, we must change too. We recently completed a comprehensive strategic planning initiative including a thorough assessment of our strengths and weaknesses and the needs of our sponsors. The priorities which emerged from this exercise can be quickly summarized.

1. Support of DOE:

   We will reinforce the historic partnership with DOE by dedicating maximum effort to helping the Department achieve its stated objectives, across the board, including the achievement of full compliance with all ES&H requirements. Regarding ES&H performance, I recognize that the potential cost impact of maintaining compliance at Sandia could become unacceptably high. For this and other sound reasons, it is essential that we realize substantial cost savings in all of our operations.

2. Total Quality:

   Following the lead taken by major U.S. industrial R&D organizations such as Motorola, Xerox and AT&T, we are instituting modern total quality management practices (including more effective utilization of human resources) with a goal of becoming a far more productive--cost, schedule, and performance-conscious laboratory. We are applying quality methodologies to technical as well as administrative functions, including ES&H management processes. In this effort we are gaining greatly from our association with AT&T Bell Laboratories, another organization which in recent years has had to make difficult adjustments in adapting to a more competitive environment.

3. Weapons for a peacetime stockpile:

   The responsibilities and challenges associated with the maintenance of our nuclear-weapons stockpile, regardless of its size, will continue to be formidable: The deterrent value of the stockpile must be sustained; safety must always be of paramount importance; reliability and quality must be consistently high; and command and control must be assured at all times.

   In responding to our nuclear-weapons RD&T responsibilities, we will place increased emphasis on more rational cost-effective solutions to near-term requirements—and on an accelerated pace of innovation in areas which are judged to have the greatest potential for significant long-term impact. Our efforts will be guided by the realization that a stockpile designed for peacetime must increasingly stress safety, security, command and control, reliability over an extended stockpile life, and broad mission applicability. Continuing rapid advances in technology world-wide not only offer opportunities for weapons improvements, but also drive a continuing need for modernization in order to avoid maintenance difficulties resulting from sunset technologies. At the same time, strong pressures to reduce defense spending mandate the lowest possible cost in development, in manufacture, in field maintenance and in retirement.

   We believe that through greater emphasis on streamlined quality processes, standardization of parts, reuse of proven designs where consistent with required functionality, and simplification of requirements, a more cost-effective approach to maintenance of a peacetime stockpile is possible. Success in this approach will require not only improved integration of research, development and manufacturing functions; but also a more cooperative working relationship with U.S. industry to support, augment and adapt new technologies emerging in the commercial world. It seems

self-evident to me that the health of the nuclear-weapons program is critically dependent not only on the state of health of DOE's weapons complex, but also on the vitality of U.S. industry. Replacement of components based on sunset technologies with foreign-made components is not a wise choice for our nuclear deterrent. This concern is especially serious for Sandia, because of our electronic and electromechanical design responsibilities.

Deterrence remains the cornerstone of U.S. strategic nuclear policy. however, arms control, and some implementation of strategic defense are becoming important adjuncts of a comprehensive integrated strategy. With a strategic arms reduction agreement under negotiation, technologies to verify compliance have acquired a new urgency. Sandia has participated in every arms control negotiation since the Limited Test Ban Treaty and has helped develop key technologies for the Non-proliferation Treaty and current START and nuclear testing negotiations. The monitoring system at Votkinsk in the USSR and much of the field instrumentation used for verifying the INF agreement were developed at Sandia. Sandia has an aggressive satellite technology program with a variety of space surveillance and space physics projects. (Incidentally, this program includes a recent cooperative effort with Columbia University to fly a joint physics mission on a Soviet satellite.)

Our verification technology and related intelligence programs constitute 12% of Sandia's work—funded by DOE and by other agencies. They represent the largest aggregation of verification technology work at any facility in the world. As the U.S. seeks to augment national technical means for verifying compliance with arms control agreements, we would expect an increase in programmatic activity in the next few years. National Technical Means are almost totally dependent upon advances in technology for results. Construction of a Center for National Security and Arms Control at Sandia has been funded to begin in FY90.

4. Solutions to problems of national importance:

We will seek opportunities to expand our technical contributions in other areas affecting national security. It is time to admit to ourselves that our national security, in its broadest interpretation, is facing serious challenges from many quarters. Our nation's failure to have achieved energy independence, our loss of preeminence in manufacturing technology, our deteriorating public infrastructure, and our mediocre performance in educating our youth are examples of weakness in our support structure for national success. At Sandia we intend to anticipate national needs and aggressively pursue integrated solutions to problems in these and other areas. In this endeavor, we will build on our established technical strengths as a way to maximize the return on federal investment in Sandia's staff and facilities. You will recall that the weapons program alone has for some time been unable to support the full array of talents and capabilities needed for effective execution of the RD&T program. A diversified customer base, including in substantial measure reimbursable programs for the DOD and other federal agencies, has helped sustain Sandia's ability to accomplish its nuclear-weapons mission.

An overarching goal of all of our programs will be to maximize opportunities for contributing directly to U.S. national economic competitiveness. We will

accomplish this goal by maximizing our interactions with U.S. industry consistent with the long-standing principles of fairness of access, avoidance of conflict of interest, and noninterference with the dynamics of a competitive market. In this way we can maximize the taxpayer's return on his investment in us by adding value back to the private sector. The nuclear-weapons laboratories are in an especially strong position to help industry. Indeed Sandia has been working with industry for years—in the weapons program, in energy research and elsewhere.

Beginning in the early 1970's, we initiated substantial efforts in combustion research, solar thermal, photovoltaic and wind system developments, advanced drilling technology, and other energy-related activities. Every case involved extensive cooperation with industry groups, and many successful technology transfers were accomplished, with significant economic impact. In the weapons program, we have supported close interactions with industry in the design and manufacture of non-nuclear components for nuclear weapons. Laboratory work at Sandia is not an isolated activity. In fact, many of the technologies and components developed for nuclear-weapons applications have been transferred to the industrial sector for other applications, such as conventional weapons. For example, Sandia's all-electronic safing, arming, and fuzing technology is being considered for application in the Patriot, AMRAAM and the Navy's Advanced Bomb Family. Sandia's involvement in "conventional weapons technology", broadly defined, constitutes about 4–5% of our work. This category includes munitions, delivery systems for weapons, reconnaissance, and the technical infrastructure which supports DOD conventional weapons (e.g., high speed resupply of weapons or munitions). Here, we demonstrate prototypes of lower–cost versions of nuclear-weapons technologies to demonstrate feasibility and to facilitate transfer to industry for production engineering and manufacture. The point I wish to make is that interactions in our direct-funded work which have benefitted industry over the years have had a scope that has not been commonly appreciated.

In recent times, we have actively pursued new ways of identifying, demonstrating, and transferring commercially valuable technology to the private sector. We have come to the conclusion that the most effective approach involves close cooperation with industrial consortia. Such arrangements permit the Laboratories to address not only long-range industrial interests, but relatively near-term objectives as well. We are thus able to impact the international competitive strength of the member companies directly, without significant danger of moving beyond the limits of "pre-competitive" R&D.We are proceeding with a cooperative program with SEMATECH to improve semiconductor fabrication equipment manufactured in the U.S. Our ability to enter into cooperative agreements with industry has been greatly strengthened by the passage of the National Competitiveness Technology Transfer Act of 1989. As a result, we expect our technology transfer activity to grow substantially. Next month we will formalize an agreement to work with a consortium of U.S. special–metals companies to improve process control for production of high-performance alloys. With only a few months having passed since the enactment of this historic legislation, we are actively pursuing almost two dozen other such agreements.

In order to stimulate the pace of our technology transfer activities,we have established a Technology Maturation Program (TMP) at Sandia—currently funded at about $3 million. The purpose of this program is to explore and

enhance the potential commercial value of our technology. Several projects in this program are very exciting and include: Simplified computer programming of numerically controlled machines, non-invasive techniques for measuring blood glucose; advanced steel processing techniques, robotics for automated edge finishing; pattern recognition techniques for medical diagnosis; advanced electro-deposition processes, and others.

The added cost of our technology transfer effort in FY90 is $16M. The DOE-funded portion is $5M, while the remainder is contributed by individual companies and consortia.

Before closing, I want to return briefly to the issue of the relationship between the Laboratories and DOE. From the beginning, we have understood our relationship with the government to be a partnership based on shared values and mutual trust. I firmly believe that the technical successes of the nuclear-weapons program can be attributed in large part to this special GOCO relationship, as practiced by DOE's Office of Military Applications. Under the arrangement conceived early in the history of the program, the government provides broad programmatic and policy guidance; the Laboratories take initiative in developing technical options and subsequently accomplishing specific weapon system developments consistent with requirements defined by policy and military decision makers. In keeping with this approach, Sandia and its two sister weapons laboratories have traditionally been delegated significant flexibility in the allocation of their level-of-effort resources among a broad spectrum of research and development efforts, all aimed at achieving a stockpile that meets the U.S. national security needs. I cannot overemphasize the importance of vertically integrating the various elements of a development cycle.

Consider this: our nation's eroding economic competitiveness is demonstrating convincingly that neither scientific nor technological excellence automatically produces a differentiating advantage in global markets. It is only when fundamental knowledge, technological innovation, and design and manufacturing are linked in an interactive, unbroken process that a nation realizes a competitive advantage from its scientific enterprise. Our nation must become much more effective at practicing such integration. The early architects of DOE's nuclear-weapons program understood this necessity, and had the wisdom to create an integrated environment within its laboratories and manufacturing plants. Today, the benefits of such an arrangement can extend far beyond its original purpose. Linked more closely to commercial enterprises, the weapons laboratories are capable of impacting U.S. economic competitiveness in ways that a fragmented approach to Government R&D support cannot. In my view, the integrated strategy for the weapons program continues to be in the nation's best interest.

Allow me to suggest that the way to preserve the essential strength of the laboratories is to agree on the following two-part bargain:

The laboratories should respond to the challenge of these difficult times by instituting improvements in their operating efficiency, with greater emphasis on mission focus and customer satisfaction; and manage their resources to achieve maximum real impact on national competitiveness, consistent with their other programmatic responsibilities. The Department of Energy for its part, should articulate clear, stable requirements for performance and deliverables and empower the laboratories to manage their resources and technical capabilities to

best achieve those ends. --- Finally, it is most important that this bargain be sealed with a commitment to maintain an adequate level of RD&T at the laboratories. Unfortunately, our vital capabilities face severe threats during this period of declining support for the technology base upon which all of our activities depend. Over the last five years under the pressure of declining real support for the weapons program, coupled with increasing requirements for production, environmental restoration, and waste management, Sandia's forward-looking research and technology development has declined drastically. The foundation of many of our contributions to safer weapons, arms control verification technologies, safeguards and security systems, cleaner manufacturing methods, waste handling techniques, and so forth, derives from our fundamental base of advanced technical capabilities. Yet, that base has eroded by 30% in purchasing power since 1988, and currently stands at only about 20% of our aggregate funding from DOE Defense Programs. Thirty percent is the minimum level which, based on our experience, makes possible a vital, sustainable base of technology activity capable of supporting both the weapons program and a reasonable set of ancillary programs. The rate of technological advances around the world is extremely fast. If Sandia and its sister laboratories are to play the major role in U. S. economic development that we are capable of, then we must keep pace. If the financial support continues the downward trend of recent years, however, even the best management practices will not realize our full potential. The weapons program, energy and environmental programs, our new economic competitiveness initiatives — all will suffer, and their potential contributions to the reversal of current national economic trends will be severely diminished. I recognize that Federal budget problems are causing hardships in many sectors of our society. However, now is the time to close ranks, protect our proven national technical resources to the maximum extent possible, and permit and encourage them to address national strategic objectives in a cooperative and non-adversarial manner.

Sandia is well on its way toward instituting needed internal redirections. AT&T has continued its stewardship responsibility for the laboratory, despite the substantial risk to its commercial business interests which association with the nuclear-weapons program entails. The potential for damage to corporate reputation is unfortunately very high, even with best management practices. Despite the "bottom line" realities of American enterprise, however, patriotism is not dead; but it can't be purchased either. Service in the national interest can still be a satisfying and exciting contribution, both for the contractor managers of the national laboratories and for the thousands of men and women who are dedicating their careers to this ideal.

Senator BINGAMAN. Thank you, Dr. Narath. Dr. Nuckolls, please go ahead.

## STATEMENT OF JOHN H. NUCKOLLS, DIRECTOR, LAWRENCE LIVERMORE NATIONAL LABORATORY

Dr. NUCKOLLS. Thank you, Mr. Chairman. I appreciate the opportunity to appear here today.

Let me pick up on the theme that President Narath mentioned near the end of his testimony. During the past few years the budget of the Department of Energy Defense Programs Research and Technology Development Program has declined substantially. Since 1986 the Livermore Laboratory has lost nearly 25 percent of its uniquely trained and skilled WRD&T personnel. This loss of

personnel is projected to continue into fiscal year 1991. The DP Research and Technology Development Program is now substantially underfunded. It has already taken the same size cut as has been projected for the U.S. defense budget in the next 5 years.

The Soviet strategic nuclear forces have not declined significantly. The United States and the Soviet Union have begun to make reductions in nuclear forces. For projected future large reductions in the number of nuclear warheads, increased laboratory efforts will be required to ensure a stable and credible deterrent. This is easily seem in the limit. For example, were the stockpile reduced to a few warheads, assuring effectiveness and survivability would be extremely difficult. During future decades advances in non-nuclear defensive technologies will decrease the effectiveness of our strategic forces.

Much remains to be done in warhead safety. The weapons laboratories have a special responsibility for nuclear warhead safety. We continue to develop new safety technologies, to define ever higher standards, and to insist that these standards be applied to the stockpile. As the number of warheads decreases, we will need to increase the effectiveness and the capability of our warheads to function in an environment of constrained nuclear testing. We will also be vulnerable to technological surprise to an increasing degree, that is, to the invention of revolutionary new warheads with qualitatively increased effectiveness.

The Department of Energy Research and Technology Development Program provides a key element of our nuclear deterrent. It enables the U.S. to respond quickly and effectively to new threats to our national security as well as to accidents. It deters hostile deployments. It provides incentives for potential adversaries to engage in arms control, and it inhibits nuclear proliferation.

The strength of the U.S. nuclear deterrent is dependent on our nuclear competence, that is, on a small number of highly trained, highly dedicated scientists and engineers in the WRD&T program. The competence of these people must be nurtured and maintained at all costs. Nuclear weapons RDT&E is a highly complicated multidisciplinary profession, learned only through years of experience, most importantly through nuclear testing. Unfortunately, the level of nuclear testing has decreased so much that we cannot sustain our present level of nuclear competence. We can hire replacements, but we do not invest enough in nuclear testing to provide the same level of experience for new recruits as those people have who are now leaving the weapons program.

As nuclear testing is increasingly restricted by treaty or by declining budgets, it is essential to develop laboratory experimental facilities which provide nuclear sources for effects testing and which will attract and retain talented scientists and engineers. And I might add, in no way are these facilities a replacement for nuclear testing.

I believe the best option for these purposes is Inertial Confinement Fusion. The current National Academy of Sciences draft report on ICF recommends that funds be provided for a NOVA laser upgrade. This is a step in the right direction. However, there is a serious problem—a 10-year time interval would be required to construct a full scale ICF facility capable of generating laboratory

fusion explosions. In a CTB period, nuclear competence would suffer a severe decline during this long delay.

I believe the best solution to this problem at the present time is the recent proposal to construct a one-megajoule laser in the existing NOVA building which could achieve ignition. This NOVA ignition laser could be constructed for approximately $300 million to $400 million. Given the state of the world and the direction that it seems to be going, I believe this option now merits serious consideration.

A strong and vital weapons research and technology development base is also essential to the laboratory's other national security missions. For example, the computer code, DYNA–3D, is a good example of how work done for national security can make major contributions to American industry. This engineering design code was originally written in 1976 to model the effects of stress and bending on materials under high impact conditions. It is now in use by more than 300 private sector organizations worldwide, including a large sector of American industry.

Codes based upon DYNA are applied to a variety of industries including automobile crash simulations by many of the world's automobile manufacturers, aluminum can manufacturing, the design of jet engine fan blades, and the safety of shipping containers for hazardous materials. Since the California earthquake last October, these codes have been applied to understand the failure of bridge and highway structures including the collapse of the Cypress Overpass in Oakland.

### ARMS CONTROL AND VERIFICATION

Now I would like to make a few remarks about arms control and verification. In this area the laboratory is making outstanding contributions to the development of new technologies tailored to the INF, START, and threshold test ban treaties. Our activities in support of the intelligence and verification communities include work on in-country seismic monitoring, tagging, nuclear detection, directed-energy detection, and chemical sampling.

Livermore supports the nuclear testing talks by contributing to the definition of options and the assessment of various alternatives. Livermore's verification activities include the Chemical Weapons Convention. Our technology work for the CWC includes evaluating sensitive analytical chemistry techniques for monitoring and for on-site inspections. Immunoassay, fiber optics, and electrochemical methods are just a few of the technologies being developed.

For START, our technology work ranges from the development of tags to highly sophisticated radiation detection devices. In the areas of tags we have developed two concepts: the passive electronic tag and the fiber optic tag. Radiation detection, x-ray fluorescence, neutron integration, interrogation, and gamma-ray telescope technologies are under development. These technologies might be useful in several START missions, for example, nonvisual determination of the number of warheads contained in the payload section of MIRVed ballistic missiles, the discrimination of nuclear from conventional cruise missiles, and the detection of solid rocket propellant at permanently monitored rocket production facilities.

Arms control treaties offer an opportunity for a safer world, but they are unlikely to become a reality unless we have confidence in the technologies used to verify them. To open new opportunities for progress in arms controls, the U.S. must accelerate the development of new treaty verification technologies. The current level of support has not kept pace with the technology requirements identified in ongoing negotiations.

### ENVIRONMENTAL RESTORATION

We are actively pursuing environmental restoration and waste management technologies that will reduce the amount of waste generated by the Department of Energy activities and cost-effectively clean up contaminated areas.

Department of Energy funding at our laboratory is growing, but it is not yet large enough to pursue the broad range of primary technologies which will be required. Let me give you some examples. We have studied the Department of Energy nuclear weapons complex and believe there are existing technologies that could reduce waste by very large amounts. For example, at present 92 percent of the uranium metal in one typical fabrication process becomes waste. Modern casting, forming, and machining could reduce this waste by over 60 percent. Newer processes that could be developed would reduce the amount of waste even further. We have recently developed a reusable stainless steel HEPA filter that will reduce mixed waste significantly, will not blow out if it gets wet, and could save the Nation about $100 million per year.

In the area of groundwater restoration, we are developing a method whereby natural underground flow brings contaminated groundwater to an underground region of natural biological organisms which transform the toxic material into inert components. If successful, this underground biological barrier would avoid the large costs of pumping groundwater to the surface. At many sites, this method could save more than $100 million.

We believe that most of these technologies will also be applied to the larger problems of commercial waste, and we are working with American industry.

### TECHNOLOGY TRANSFER

National security requires a strong and competitive U.S. economy. The Department of Energy laboratories have been asked to assume leading roles in developing new technologies and transferring them to industry. I would like to note a few of our activities.

More than 50 companies have been formed by our ex-employees based on technologies developed at the laboratory. These companies create hundreds of millions of dollars of annual sales. They have had major market impacts in areas such as computer-aided engineering and design, instrumentation, lasers, and pulse power. This movement of people from the laboratory to industry is one of the very best forms of technology transfer. However, when laboratory employees leave the lab to commercialize laboratory developed technologies, there may be the appearance of conflict of interest. Congressional legislation should encourage and facilitate technology transfer by people transfer.

In the past few years we have begun a program of licensing laboratory technologies to industry. This program was enabled by a series of laws passed by Congress beginning in 1980. Treating valuable technology as intellectual property allows us to control the recipient of the technology and thus ensure that domestic companies benefit. To date, we have concluded more than two dozen license agreements. These agreements, covering both patented and copyrighted technologies, represent millions of dollars of industry investment to bring products to market. Many of these agreements are with small business and start-up companies. They span industries such as computers, electronics, software, biotechnology, and advanced materials.

We have also begun a program of stimulating collaborative R&D relationships with industry. We have entered into 10 agreements involving two dozen companies in cost-shared collaborative areas. Total R&D investments in these projects are greater than $10 million, with approximately half coming from industry.

I would like to highlight two of these projects. We have concluded agreements with eight oil companies to do research in petroleum geochemistry, leading to improved tools to locate oil deposits. Four additional companies have recently agreed to join this consortium under cost-shared agreements. This activity resulted in one of three Federal laboratory consortium technology transfer awards made to the laboratory recently.

We have recently concluded agreements with Caterpillar Tractor, Northstar Steel, and Ladish, a forging company, to do further research and development leading to commercialization and high tonnage production of super plastic steel. This specialty steel promises to greatly reduce the costs of machining precision metal parts and to have superior performance in some applications.

This vertical consortium of non-competing and mutually dependent companies could become an important model for future collaboration between industry and national laboratories. This consortium was made possible by the congressionally mandated steel initiative.

One of our most significant contributions to U.S. competitiveness will unfold over the next few years as our uranium laser enrichment process, AVLIS, is transferred to industry. An industrial access program is planned for later this year and selection of a commercial deployment contractor during 1992. This technology will have a strong economic advantage in a multi-billion per year uranium enrichment market. Congress should facilitate this kind of large-scale technology laboratory project aimed at helping the U.S. economy.

Another even larger-scale project, looking out into the next century, is fusion energy. Development of an economically superior fusion power plant would be worth more than $100 billion per year to the U.S. economy in the next century.

Discussions are under way with large and small companies in areas such as industrial applications of lasers, x-ray lithography for the semiconductor industry, many applications of our biotechnology research, precision manufacturing technologies, large-scale computing, advanced material technologies, and detection and clean-up of environmental contaminants.

During this year we have initiated several projects under our Institutional Research and Development Program, which may lead to significant industrial applications and future cost-shared collaborative R&D agreements with industry. Among these are crystal growth technology, laser-assisted processing of semiconductor materials, diode laser development for laser pumping, laser machining, and massively parallel processing. Many of these projects could move much faster if more funds were available. I believe Congress should seriously consider providing funds to the national laboratories earmarked for helping U.S. industry.

Last year Congress made technology transfer a mission of the national laboratories. You gave us some additional new tools, which are very important, including withholding of valuable technical data for commercialization and a simplified process to enter into cooperative agreements with industry. We are working with the Department of Energy now to help ensure that we put in place policies and procedures which are supportive of this technology transfer mission, and that we simplify the processes we go through to enter into agreements with industry. We have learned that speed and certainty are very important to our industrial partners.

Let me summarize by saying that it is important to nurture the high potential research and technology development base in the Department of Energy weapons laboratories for all aspects of national security. The laboratories' contributions to defense, economic competitiveness, energy security, and the environment depend on the investments we make in this technology base. I want to thank you for the opportunity to appear here and for your support of these important programs.

[The prepared statement of Dr. Nuckolls follows:]

Statement of John H. Nuckolls, Director
Lawrence Livermore National Laboratory

Mr. Chairman and members of the Subcommittees. I appreciate this opportunity to testify at this hearing on DOE nuclear weapons laboratory programs and management.

## RESEARCH AND TECHNOLOGY DEVELOPMENT

During the past few years, the budget of the DOE research and technology development program has declined substantially. Since 1985, the Livermore Laboratory has lost nearly 25% of its uniquely trained and skilled WRD&T personnel. This loss of personnel is projected to continue into FY 1991. The DOE research and technology development program is substantially underfunded.

The Soviet strategic nuclear forces include more than 10,000 warheads, and this capability has not declined significantly.

The United States and the Soviet Union have begun to make step-by-step reductions in nuclear forces. As the number of nuclear warheads decreases, increased Laboratory efforts will be required to ensure a stable and credible deterrent. This is easily seen in the limit. Were the stockpile reduced to a few warheads, assuring effectiveness and survivability would be extremely difficult. Hundreds of nuclear warheads could inflict catastrophic damage on the U.S.

During future decades, advances in non-nuclear technologies will decrease the effectiveness of our strategic forces and generate requirements for weapons which are qualitatively different from existing weapons. We have a special responsibility for warhead safety. Continued improvements are required in the safety area. Future warheads must also be more robust and flexible, better suited to constrained nuclear testing. For all these reasons, as the number of weapons decreases, the requirements on the remaining weapons and on weapon

research and development will increase.

The DOE research and technology development program provides a key element of our nuclear deterrent. It is an essential part of the DOE capability to manufacture, test, monitor and dismantle nuclear weapons. It allows the U.S. to respond quickly and effectively to new threats to our national security and to accidents. This rapid and effective response capability deters hostile deployments and threatening actions. A strong research and development program provides incentives for potential adversaries to engage in arms control, and it inhibits proliferation.

The strength of the U.S. nuclear deterrent is dependent on our nuclear competence--on a small number of highly trained, highly dedicated scientists and engineers in the WRD&T program. It is the competence of these people which must be nurtured and maintained at all costs. Nuclear weapons design and engineering are not taught at any university. It is a highly complicated multi-disciplinary effort learned only through years of experience, including experience in nuclear testing. Unfortunately, the level of nuclear testing has decreased so much that we cannot sustain our present level of nuclear competence. We can hire replacements, but we do not have enough nuclear tests to provide the same level of experience which those people have who are leaving.

In a CTB era, it would be essential to have experimental facilities which provide nuclear sources for effects testing and which will attract and retain talented scientists and engineers. I believe the best option for these purposes is ICF. In the National Academy of Sciences (NAS) draft report on ICF, there is a recommendation that funds be provided for a NOVA laser upgrade. However, this recommendation would not shorten the 7-10 year time interval required to construct a full scale ICF facility capable of generating Laboratory fusion explosions. In a CTB period, nuclear competence would suffer a severe decline during this long delay.

It is possible to construct a one-megajoule laser in the existing NOVA building which could achieve ignition. Preliminary estimates are that this "ignition NOVA" could be constructed in 6-7 years for a cost of $300-$400 million. Given the state of the world, I believe this option merits serious consideration.

A strong and vital weapons research and technology development base is also essential to the Laboratory's other national security programs. The computer code DYNA-3D is a good example of how work done for national security needs can make major contributions to American industry. This engineering design code was originally written in 1976 to model the effects of stress and bending on materials in three dimensions subject to strong forces. It is now in use by more than 300 private sector organizations world wide including a large sector of American industry. Codes based upon DYNA are applied in a variety of industrial applications including automobile crash simulation (by many of the world's automobile manufacturers), in explosives safety, aluminum can manufacturing, the design of jet engine fan blades, and the safety of shipping containers for hazardous materials. Since the great earthquake of last October 17th, the code has been applied successfully to understand the failure of bridge and highway structures including the collapse of the Cypress Overpass.

## ARMS CONTROL--VERIFICATION

In the area of verification research, the Laboratory is making outstanding contributions to the development of new technologies tailored to the INF, START, and threshold test ban treaties. During FY 1990, the responsibilities of the LLNL T · ·rification Program have expanded in all areas of arms control r · nder negotiation.

Our activities in support of the intelligence and verification communities includes work on in-country seismic monitoring, tagging, nuclear detection, directed-energy detection, and chemical sampling. We also forecast technology requirements, support the Washington community and delegations

with information regarding what technology can and cannot be expected to do, and respond rapidly when specific system requirements are identified by the negotiators. Our work merges analyses of technology developments with possible verification frameworks.

During 1990, Livermore continues to support the Nuclear Testing Talks by contributing to the definition of options and the assessment of various alternatives. The options have been defined on the basis of observational data acquired from routine U.S. tests at the Nevada Test Site, explosions at foreign sites, and from experiments and theoretical studies of source region effects. In the course of these studies, we have compiled an extensive data base of nuclear explosion characteristics. The results of the studies help clarify the values involved in determining the monitoring provisions and have been factors in the selection of specific treaty options.

During 1990, Livermore's verification responsibilities have been expanded to include the area of the Chemical Weapons Convention (CWC). For the last ten years, the U.S. has been engaged in negotiations to draft a comprehensive arms control treaty that would prohibit the production, stockpiling, transferring, and use of chemical weapons. The present draft agreement calls for implementation by an international agency. In support of the CWC, we are helping to define an effective technology development plan and are participating in the planning and evaluation of the National CW Trial Inspections.

Our technology work for the CWC includes evaluating sensitive analytical chemistry techniques for applicability in monitoring, and for on-site inspections. Livermore has also been evaluating current microsensor technology for effective monitoring of a CWC agreement. Immunoassay, fiber optics, and electrochemical methods are just a few of the technologies being considered.

For START, our main focus has been developing and evaluating verification

regimes and the technologies to implement them. Our technology work ranges from the development of tags--whereby treaty-limited items would have a unique or non-reproducible identifier permanently attached to it--to highly sophisticated radiation detection devices. In the area of tags and seals, we have developed two concepts: the passive electronic tag and the fiber-optic tag or seal. In radiation detection, x-ray fluorescence, neutron interrogation, and gamma-ray telescope technologies are under development. These three technologies might be useful in several START missions--non-visual determination of the number of warheads contained on the payload section of MIRVed ballistic missiles, the discrimination of nuclear from conventional cruise missiles, the detection of solid rocket propellant at permanently monitored rocket-motor production facilities, and warhead control for special nuclear material destruction if it is required in START.

The area of Conventional Forces in Europe (CFE), although fast-moving, will require less in the way of sophisticated verification technologies. However, because of the mobility of the assets in CFE, and the large number of bases, storage sites, treaty-limited items, and geographical areas, the DOE Office of Arms Control has undertaken a framework analysis study in which Livermore is participating. The purpose of this fast-track effort is to evaluate which roles, if any, would require technologies to improve verification or minimize inspection cost.

The proposed treaties offer an opportunity for a safer world, but they are unlikely to become reality unless we have confidence in the technologies used to verify them. To open new opportunities for progress in arms control, the laboratories must accelerate the development of new treaty verification technologies. This will require additional funding. The current level of support has not kept pace with the technology requirements identified as needed in today's negotiations. Yet, the proposed FY 1991 operating budget has declined from FY 1990 levels.

## ENVIRONMENTAL RESTORATION

We are actively pursuing research, and developing environmental restoration and waste management technologies that either greatly reduce the amount of waste generated by Department of Energy activities or efficiently clean-up areas where the environment has become contaminated as a result of past practices. At present, DOE funding in this area at our Laboratory is growing, but it is not nearly adequate to pursue the broad range of technologies that we have available.

Let me give you some examples of these technologies. We have studied the DOE nuclear weapons complex and believe that there are existing technologies that would reduce waste by very large amounts. For example, at present 92% of the material in one typical process becomes waste. Modern casting, forming, and machining could reduce this amount by over 60% today. Even newer processes, that we believe could be developed, would reduce the amount of waste even further.

Together with industry, we have developed a process which allows the complete destruction of mixed waste while enabling recovery and recycling of metals. We have also recently developed a reusable stainless steel HEPA filter that will reduce mixed waste significantly, will not blow out if it gets wet, and could save the nation about $100 million/yr.

In the area of groundwater restoration, we are developing a method whereby natural underground flow brings contaminated ground water to an underground region of natural biological organisms which transform the toxic material into inert components. If successful, this biological barrier would avoid the large costs of pumping groundwater to the surface and then treating the water and putting it back into the ground. At one site alone this method would save more than $100 million.

I have provided a few examples of ways that our Laboratory's skills and resources are being applied to the Department's waste and environmental problems. We believe that most of these and other technologies will also be applied to the larger problem of waste in general, and we are working with American industry to acquire and implement these to the benefit of our society.

## TECHNOLOGY TRANSFER

National security requires a strong and competitive U.S. economy. The DOE laboratories have been asked to assume leading roles in developing new technologies and transferring them to industry. I would like to note a few of our past contributions, some current activities, and finally, some possible contributions that could have a significant impact on the future.

More than 50 companies have been formed by our ex-employees, based on technologies developed at the Laboratory. These companies create hundreds of millions of dollars of annual sales. They have had major market impacts in areas such as computer-aided engineering and design, instrumentation, lasers and pulsed power. This movement of people from the laboratory to industry is one of the very best forms of technology transfer. However, because Laboratory employees might get rich if they leave the Lab to commercialize Laboratory-developed technologies, there is the appearance of conflict of interest. The most effective technology transfer is through people transfer. Congressional legislation should encourage and facilitate the transfer of people with technology.

In the past few years, we have begun a program of licensing laboratory technologies to industry. This process was enabled by a series of laws passed by Congress beginning in 1980. Treating valuable technology as intellectual property allows us to control the recipient of the technology and thus ensure that domestic companies benefit. This was not always possible under older public domain approaches to technology transfer. To date, we have concluded more

than two dozen license agreements. These agreements, covering both patented and copyrighted technologies, represent millions of dollars of industry investment to bring products to market. They have also generated approximately a half-million dollars in revenues back to the Laboratory. Many of the agreements are with small business and start-up companies. They span industries such as computers, electronics, software, biotechnology and advanced materials.

We have also begun a program of stimulating collaborative R&D relationships with industry. We have many agreements with industry to share improvements to laboratory-developed software, while protecting future commercial potential for domestic licensees. We have entered into ten agreements involving two dozen companies in cost-shared collaborative agreements. Total R&D investment in these projects is greater than ten million dollars, with approximately half coming from industry. I would like to highlight two of these projects.

As an outgrowth of DOE-funded R&D in oil shale, we have concluded agreements with eight oil companies to do further research in petroleum geochemistry leading to improved tools to locate oil deposits. Four additional oil companies have recently agreed to join this consortium under cost-shared agreements. This activity resulted in one of three federal laboratory consortium technology transfer awards made to Livermore recently.

We have recently concluded agreements with Caterpillar Tractor, Northstar Steel, and Ladish, a forging company, to do further R&D leading to commercialization and high tonnage production of superplastic steel. This specialty steel promises to greatly reduce the cost of machining precision metal parts, and to have superior performance in some applications such as wear parts and high-strength applications. This vertical consortium of non-competing and mutually dependent companies could become an important model for future collaboration between industry and national laboratories. The

consortium was made possible by the Congressionally-mandated Steel Initiative.

One of our most significant contributions to U.S. competitiveness will unfold over the next few years, as our uranium laser enrichment process--AVLIS-- is transferred to industry. An industrial access program is planned for later this year, and selection of a commercial deployment contractor during 1992. This technology will have a strong economic advantage in a multi-billion dollar per year market which will become substantially larger in the next century. The Congress should facilitate this kind of large scale, national laboratory project aimed at helping the U.S. economy. Another even larger scale project on a longer time scale is fusion energy. Development of an economically attractive fusion power plant would be worth more than one hundred billion dollars per year to the U.S. economy in the next century.

We expect significant growth in our relations with U.S. industry. Discussions are underway with large and small companies in areas such as industrial applications of lasers, X-ray lithography for the semiconductor industry, many applications of our biotechnology research, precision manufacturing technologies, large-scale computing, advanced material technologies, and detection and clean-up of environmental contaminants.

During this year, we have initiated several projects under our Institutional Research and Development Program which may lead to significant industrial applications and future cost-shared collaborative R&D agreements with industry. Among these are crystal growth technology, laser-assisted processing of semiconductor materials, diode laser development for laser-pumping, laser machining, massively parallel processing and X-ray lithography for semiconductor processing. Many of these projects could move much faster if more funds were available. I believe Congress should provide funds to the national laboratories earmarked for helping the U.S. economy.

Last year, Congress clearly made technology transfer a mission of the national laboratories, including Livermore. You gave us some important new tools, including withholding of valuable technical data for commercialization, and a simplified process to enter into cooperative agreements with industry. Secretary Watkins has made it clear that this is important to him. I enthusiastically support this mission for the Laboratory. We are working with the Department of Energy now to help ensure that we put in place policies and procedures which are supportive of this mission, and that we simplify the processes we go through to enter into agreements with industry. We have learned that speed and certainty are very important to our industrial partners.

SUMMARY

It is important that we nurture the high potential research and technology development base in the DOE weapons laboratories. The Laboratory's contributions to defense, economic competitiveness, energy security and the environment depend on the investments we make in this technology base.

I want to thank you for the opportunity to appear here and for your support of the Laboratory's programs. I look forward to working with the Congress to meet these difficult challenges.

Senator BINGAMAN. Thank you very much. Dr. Hecker, please go ahead.

**STATEMENT OF SIEGFRIED S. HECKER, DIRECTOR, LOS ALAMOS NATIONAL LABORATORY**

Dr. HECKER. Thank you, Mr. Chairman, for the opportunity to share my views with you this morning. I agree very much with Dr. Narath's comment about the importance of the special relationship between the Government and the Department of Energy laboratories. Of course, for the case of Lawrence Livermore and Los Alamos, the contractor is the University of California and, very much as in the case of AT&T, it performs that strictly as a public service.

What I would like to do is address the global issue of the future of the labs and then answer some of the specific questions that you posed in your invitation about areas like arms control, environment, and tech transfer.

There are essentially three points I would like to make this morning. One, that nuclear weapons research, development, and testing are still important even in the future as we see it today. Two, that we can and should play a significant role in the broad area of defense technologies. And three, as pointed out by my colleagues, that there are a number of areas in the non-defense sectors that we could make important contributions to, areas such as energy, environment, economic competitiveness, and health and human welfare. And I will give you some examples of those.

Let me first make some comments about the general aspects of nuclear weapons requirements and especially about nuclear weapons research, development, and testing. And if I may, I would just like to share a few of my observations with you of a trip that I took to Europe just a couple of weeks ago, and it was a repeat of a similar one that I took a year ago.

I visited a number of U.S. military installations. I visited NATO headquarters and then both military and policy people in Bonn, West Germany, as well as in Paris, France. I found a rather interesting comparison to last year, that the mood this year was certainly very much one of optimism, but also of great caution, and particularly it seemed that the importance of nuclear deterrence was well appreciated in spite or maybe because of the changes that have occurred in the past year, and that at least it appeared to me on the basis of the people whom I have talked to, that the American military presence is clearly considered to be paramount to stability in Europe.

I think from a standpoint of nuclear weapons research, development, and testing, as we look at certainly a kinder, but somewhat more uncertain future, that RD&T becomes still very important, and we can look at it essentially as a necessity to keep our technological edge and as an insurance policy for the future. And in fact many have said that it is the vigorous RD&T program and the existence of these three laboratories themselves that are a key to deterrence. But certainly the way that the world has changed has also helped to change the priorities of our RD&T program. And there is no question that today nuclear weapons safety is first and foremost on our priority list.

I can think of no other potential problem or threat to deterrence that could be more debilitating than a nuclear weapons accident. Also, the dynamics of deterrence are as important today as they were in the future. I think today we need to apply our skills to make certain that we build down the arms in such a way that we retain the security of the United States as well as overall global stability. Nuclear competence and the importance of testing have already been mentioned by John Nuckolls.

We also have geared up to try even harder in the future to get a better fundamental understanding of nuclear weapons in case there are more test limitations. And as John Nuckolls pointed out, technological surprise becomes even more important, especially if you reduce the total number of warheads.

I have great concern about nuclear weapons RD&T for the same reasons that were pointed out by my colleagues and that is, we have also seen approximately a 25 percent reduction in our nuclear weapons RD&T program. This is particularly curious when associ-

ated with the fact that we currently have quite a heavy weaponization workload, and of course, the environmental, safety, and health related expenses are such that I believe the combination of all of those impair our ability to prepare properly for tomorrow.

This technology base that we talk about in the nuclear weapons arena rests essentially in the three laboratories that are represented here today and not in thousands of companies and other institutions around the country.

Now at Los Alamos the RD&T activities including inertial confinement fusion and nuclear-directed energy research represent about $300 million annually of our operating budget. And this RD&T is critical to our success, not only because of the size, that is the dollars associated with the program, but because of the nature of the program. And the nature is such that it has at Los Alamos for 47 years supported us in a mutuality agreement that is between the Department of Energy and the University of California and has provided essentially block funding so that we can meet the requirements of the stockpile, as well as explore the frontiers of science and technology to make sure that we can avoid technological surprise. It is this exploration that has allowed us to build this broad science and tech base that my colleagues have referred to as allowing us then to step out and be able to contribute in a number of other areas.

Let me turn to the broader defense responsibilities. Certainly one important way that the labs will maintain their vitality is to serve the Nation in this broader defense responsibility sense. That is, as the funding for nuclear weapons has declined, we have indeed done much more in areas such as arms control and verification, as well as environmental R&D, and very much as our colleagues at Sandia and Livermore, we have been very active in the arms control verification business since the Limited Test Ban Treaty in 1963 when we started putting instruments on spacecraft and satellites in order to be able to monitor the verification requirements associated with that test ban treaty.

We are also involved in the nonproliferation treaty. We have been very actively involved in the threshold test ban treaty as well as other negotiations, the INF, START, and Defense in Space. Our budget in this area is $35 million in fiscal year 1990. That is up about 4 percent from last year. So that certainly is a positive step, but it by no means offsets the loss in RD&T.

In the environmental R&D arena, quite frankly the funding has been very disappointing. I believe strongly that we must be able to work smarter in order to afford the clean-up of the Department of Energy weapons complex and working smarter means doing research and development and couple that into industrial capabilities to be able to clean up. However, for fiscal year 1990 at least, that funding has barely materialized. The new R&D funds at Los Alamos for fiscal year 1990 are about $1.2 million.

In addition, the difficulty is, as I mentioned, in these particular areas that we do not have the charter as we do in RD&T, and it is more difficult to continue to develop this broad science and technology base. So again, they do not serve to offset the RD&T reductions.

In, again, this broader defense sense, in addition to what we have done in arms control verification, in environmental R&D, which is still for the Department of Energy, we also have taken on a number of technology developments that have been done directly for the Department of Defense: advanced technologies such as the free-electron laser, and neutral particle beams for strategic defense concepts. We have also explored what one calls soft-kill concepts such as combustion inhibitors, that is, basically shutting down running machinery or engines or electromagnetic pulses that may wipe out your electronics.

We have also developed technologies for the fight against drugs and terrorism, and we continue to work on defense technologies such as armor, anti-armor, anti-submarine warfare, and we continue to support the technological requirements of this country's intelligence community.

Now these broader defense responsibilities also do not share the same attributes of our nuclear weapons RD&T program. They often tend to be smaller, shorter term. They are more management, paperwork intensive and are not necessarily as directly tied to applications as we are in the nuclear weapons business.

They also do not fit as neatly into the Washington funding structure as does our Department of Energy work. I think that to take better advantage of the labs' skills, we need to team with defense contractors and in fact, we have done that in the past couple of years in areas like free electron lasers with Boeing and in areas like particle beams with Grumman.

We also need to explore better agency cooperation and planning, that is between the Department of Energy and Department of Defense. In relation to one of your specific questions that you asked about defense spending, I would like to point out that the work that Los Alamos has done directly for the Department of Defense has actually declined in the past 3 years, very much along with the general decline in defense spending. At Los Alamos we had a 16 percent decline in the last 3 years.

Let me turn to other contributions that we can make to the Nation. The bottom line is really that we can enhance our contributions to the Nation in a broad spectrum of large technologically complex initiatives, or as I like to call it, where science makes a difference. That is really the cultural heritage of Los Alamos. During the Manhattan Project, without science, we would have had no Manhattan Project and no atomic bomb. We work on very large, complex technology, but science has to make that added difference, and in these areas we think, as has also been pointed out before, that we need a new partnership with U.S. industry in order to be able to take advantage of these technologies.

The common denominator in what we do is that typically the things we do are very high risk, they are generally longer term, continuity of effort is extremely important, and that we do it for the sake of the public benefit, not the benefit of any individual corporation. The reciprocal benefits to the laboratory are these nondefense activities that in turn allow us to remain a first-class defense laboratory with the ability to preserve our nuclear weapons capability.

The sort of examples, I will just run through them quickly and then mention one or two specifically. In the energy area, we have developed a hot, dry rock geothermal process where we can extract the heat in the Earth's core by some rather clever techniques that we have worked on for about 15 years, and we are now getting industry interested because it is a source of abundant energy and also what is very important today, it is a source of potentially very clean energy.

In the area of the environment, I mentioned a number of things that we have done there in working with the Department of Energy. We have developed what we call a midget mass spectrometer. It is essentially a tool that one can put in the back of a pickup truck or in the truck of a car and take out to a specific location to do an on-site chemical analysis of the problem that you have, let us say in the soil, in the water, or in the air. We project currently that that will cut in half the costs associated with chemical analyses, which now has to be done by taking samples, bringing them back to the laboratory, and going through a multi-week process. We still have to do some technology development and make certain that we can get this technique approved by the Environmental Protection Agency.

In the area of economic competitiveness, Senator Bingaman, I know that is one that is particularly of great interest to you, and as has been pointed out, much has been done in the area of legislation to provide us with the tools and capabilities to work in this direction. As you know, we have been very actively involved with industry in what we call the Superconductivity Pilot Center where we were actually able to get on a trial basis some of the benefits of the legislation that you introduced and that was passed in 1989. We have extremely successful collaborations currently with a number of large companies like Hewlett-Packard and DuPont and also with a number of very small start-up companies.

We continue to be very active in the area of high-performance computing. The one specific example that I would like to bring up is the example of photolithography and that is the ability to write extremely fine lines and lots of information on to a computer memory chip. As you well know, that is a technology that the Japanese have overtaken us in and they now supply the bulk of the world's computer memory chips.

As a result of one of our SDI programs, the free electron laser program, we have developed the tools to be able to use the free electron laser, or at least to get it to the point where we can look at, using the light from a free electron laser instead of, let us say, mercury lamps that are used now or other lasers or x-rays that are being considered currently, to be able to write extremely fine lines and be able to package an enormous amount of information onto one of these computer memory chips. We are currently working with U.S. industry to get them interested in using the free electron laser as essentially the light bulb for this photolithography.

Now, the potential that it has is that it will get us down to a resolution of about one-tenth of a micron or so, which is about 10 times better than one can do currently and even two times better than one projects the best they can do with x-ray synchrotron lithography. That would provide us, if indeed one can pull off such a

project, with the capability of leapfrogging the Japanese because now their capabilities in free electron lasers are rather primitive, since most of that was funded for strategic defense research.

So we have that potential. That is the type of project that we are particularly interested in, large complex technology. It is going to take a lot of science and of course, a lot of engineering, and a lot of interaction with U.S. industry. And it may pay off, let us say, in a 10-year time frame or so. In fact, that whole concept of concentrating on a number of strategic technologies, as I call them, technologies that are important for both our military as well as our commercial well-being in this country, is one that I have tried to push as a very important area where laboratories like ours could make a significant contribution.

Let me just last mention a couple of other areas such as health and human welfare. We are very actively involved in the program for mapping the human genome and again, using the computer capabilities of the laboratory, which are the finest scientific computer capabilities in the world, and using our laser-based capability.

We are also working in the area of the Moon/Mars mission to use the capabilities of the laboratory to perhaps be able to speed up the transportation problems.

So that is just a quick walk-through of some of the technological areas that are important to non-defense business.

In summary, as far as I see it at the laboratory, the bottom line is that we need to have smart people thinking about national security, and national security in this very broad sense, to have them think about it in an environment where they can effect solutions. And that is what our laboratories are all about. In closing, I would like to thank both of the subcommittees for the strong support that they have given our programs over the years. Thank you.

[The prepared statement of Dr. Hecker follows:]

PREPARED STATEMENT OF S. S. HECKER, DIRECTOR

LOS ALAMOS NATIONAL LABORATORY

OPENING REMARKS

- I agree with Dr. Narath about the importance of the special relationship between the government and the DOE weapons labs
- The outstanding contributions of the labs have been reaffirmed numerous times
  - Senate Blue Ribbon Task Group (Judge Clark Panel) 1985
  - Energy Research Advisory Board 1985
- I will address the global issue of the future of the labs and answer the specific questions posed in your invitation

CHANGING NUCLEAR WEAPONS REQUIREMENTS

- Observations from my recent trip to Europe
- Soviets are still considered "the" military threat by the Europeans
- Strong support for nuclear deterrence. Nuclear weapons in Europe and the NATO alliance remain critical
- American military presence is seen as the key to European security and stability
- Arms control is woven into the fabric of European security
- Regional conflicts and nuclear proliferation are of concern

NUCLEAR WEAPONS RD&T

- R&D provides an insurance policy for an uncertain future
- The level of R&D does not simply scale with number of weapons
- A vigorous RD&T program and first-rate laboratories themselves are a key to deterrence
- Current RD&T priorities reflect the changing world
  - Nuclear weapons safety
  - Dynamics of deterrence - arms build down
  - Nuclear competence - importance of testing
  - Fundamental understanding - in case of more test limitations
  - Avoid technological surprise
- Budget cuts have eroded the nuclear weapons technology base
  - 25% loss in manpower in past five years
  - Current, heavy weaponization workload and ES&H expenses impair our ability to prepare for tomorrow
  - Tech base is fragile - it resides principally in the three labs
- At Los Alamos RD&T (including ICF and nuclear directed energy) is $300M/year
  - RD&T program is critical to success of labs not only because of dollars but the way the program is managed
    - Block funding/mutual goals
    - Charter to explore the frontiers of science and technology to avoid technological surprise

A BROADER DEFENSE RESPONSIBILITY

- One way the labs can maintain their vitality and serve the nation best is by taking on a broader defense responsibility
- We have done so in areas such as
  - Arms control and verification
  - Environmental R&D for cleanup of the DOE weapons complex
- In arms control and verification technologies Los Alamos has funding of $35M in FY1990, up 4% from last year
- Environmental R&D funding has been very disappointing

- We have many good ideas to make cleanup cheaper and quicker - but the funding has essentially not materialized. New R&D funds for FY1990 at Los Alamos total $1.2M

- In addition, we have
  - developed advanced technologies such as free-electron lasers and neutral particle beams for strategic defense concepts
  - explored "soft kill" concepts such as combustion inhibitors or electromagnetic pulses
  - developed technologies for the fight against drugs and terrorism
  - continued to work on other defense technologies such as armor/antiarmor and anti-submarine warfare
  - and supported the technological requirements of the intelligence community
- Most of these broader defense responsibilities do not share the attributes of nuclear weapons RD&T. They
  - are often small and shorter-term
  - are management and paperwork intensive
  - are not necessarily tied to applications
  - do not fit neatly into the Washington funding structure
- To take better advantage of the labs' skills, we are
  - teaming with defense contractors for a more direct tie to applications and
  - we need to explore better DoD/DOE coordination
- I want to point out that at Los Alamos the work done directly for DoD has decreased with the decreasing defense budget (16% in past three years)

OTHER CONTRIBUTIONS TO THE NATION

- Bottom Line - We can enhance our contributions to the nation in a broad spectrum of large, technologically complex initiatives where science make a difference. In these areas we require a new partnership with U.S. industry to bring our technologies to fruition.
- Common Denominator - High risk, long-term, continuity of effort for public benefit
- Reciprocal Benefit - These non-defense activities allow us to remain a first rate defense lab with the ability to preserve our nuclear weapons capabilities
- Examples taken from our work at Los Alamos:
  (1) Energy - Hot Dry Rock: abundant, clean energy for the future
  (2) Environment - Midget Mass Spectrometer: drastically reduces the time and cost of chemical analysis for site characterization
  (3) Economic Competitiveness - develop generic technologies of strategic importance to the United States. Two examples: (a) free-electron laser photolithography: potential of leap-frogging Japanese memory computer chip manufacture with SDI technologies; (b) high-performance computing: collaborative R&D with industry and universities to keep our lead
  (4) Health and Human Welfare - Human Genome Program: computational and laser-based technologies enable the mapping of the chemical base pairs on the DNA
  (5) Space - Moon/Mars Missions: a host of lab technologies including nuclear power and propulsion, advanced materials, and health protection systems offer quicker and more affordable moon/Mars exploration
  (6) Basic Research - Los Alamos runs national user research facilities for medium energy physics and neutron scattering. We are involved in the Superconducting Super Collider: Lab's technologies offer significant advances for complex particle detectors

THANK BOTH SUBCOMMITTEES FOR THEIR STRONG SUPPORT OVER THE YEARS

# Los Alamos National Laboratory

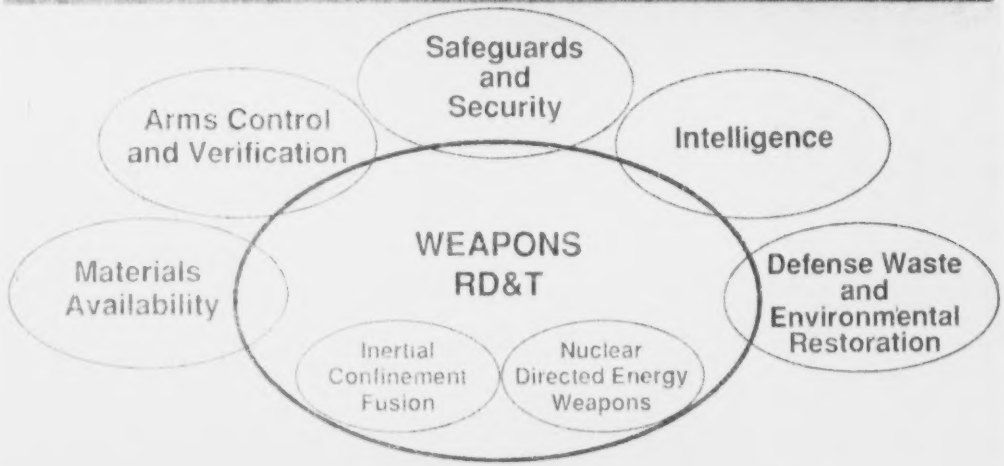
## Siegfried S. Hecker
## Director

### Presentation to:
### Senate Armed Services Committee

Subcommittee on
Defense Industry and Technology
and
Strategic Forces and Deterrence

**May 23, 1990**

## THE LABS CONTRIBUTE TO MANY AREAS OF DOE DEFENSE PROGRAMS




All of these depend on our core weapons RD&T

Arms Control Verification
A 25-Year History
Threshold Test Ban Treaty
Limited Test Ban Treaty
Non-Proliferation Treaty
Outer Space Treaty
ARMS CONTROL
Los Alamos

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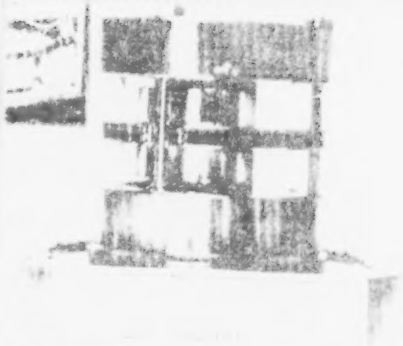
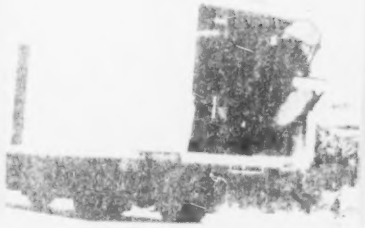
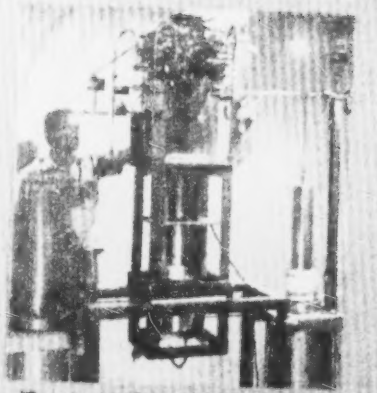
# ENVIRONMENTAL R&D WILL HELP US CLEAN UP SMARTER AND CHEAPER



A field transportable mass spectrometer for the analysis of contaminants

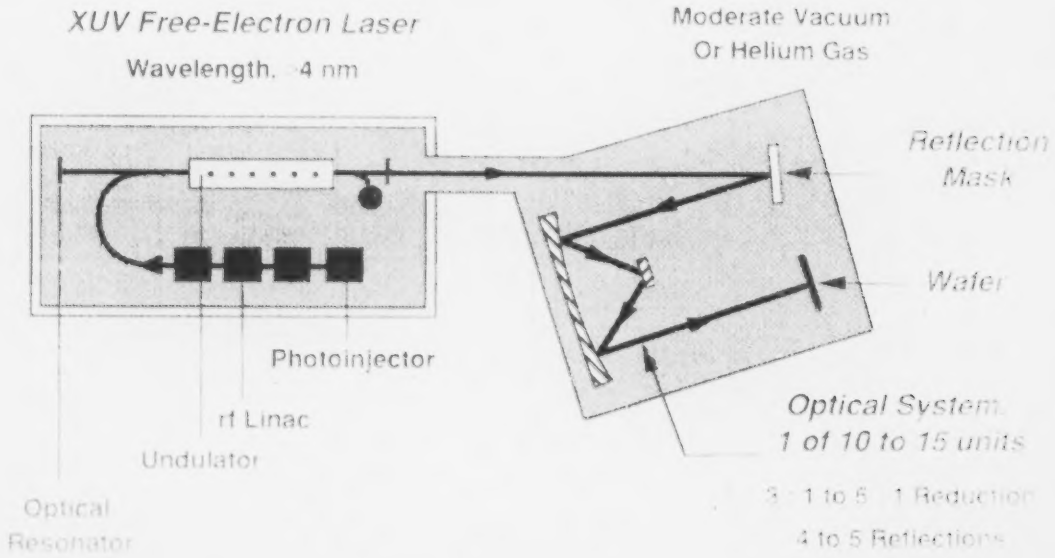
Engineering development of a system using plant cells in waste treatment





Destruction of hazardous wastes by supercritical water oxidation (SCWO)

## LOS ALAMOS APPROACH TO 0.1-μm RESOLUTION LITHOGRAPHY WILL USE AN XUV FREE-ELECTRON LASER, A REFLECTING MASK AND PROJECTION SYSTEM, AND SURFACE-IMAGING RESISTS

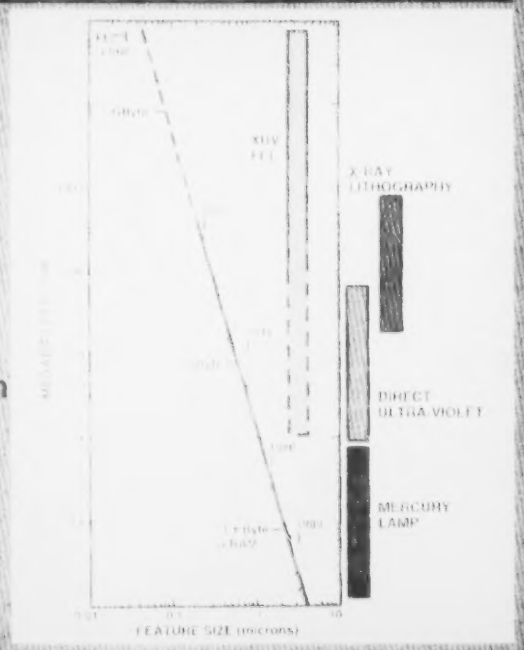



Los Alamos

CLS-89-7512

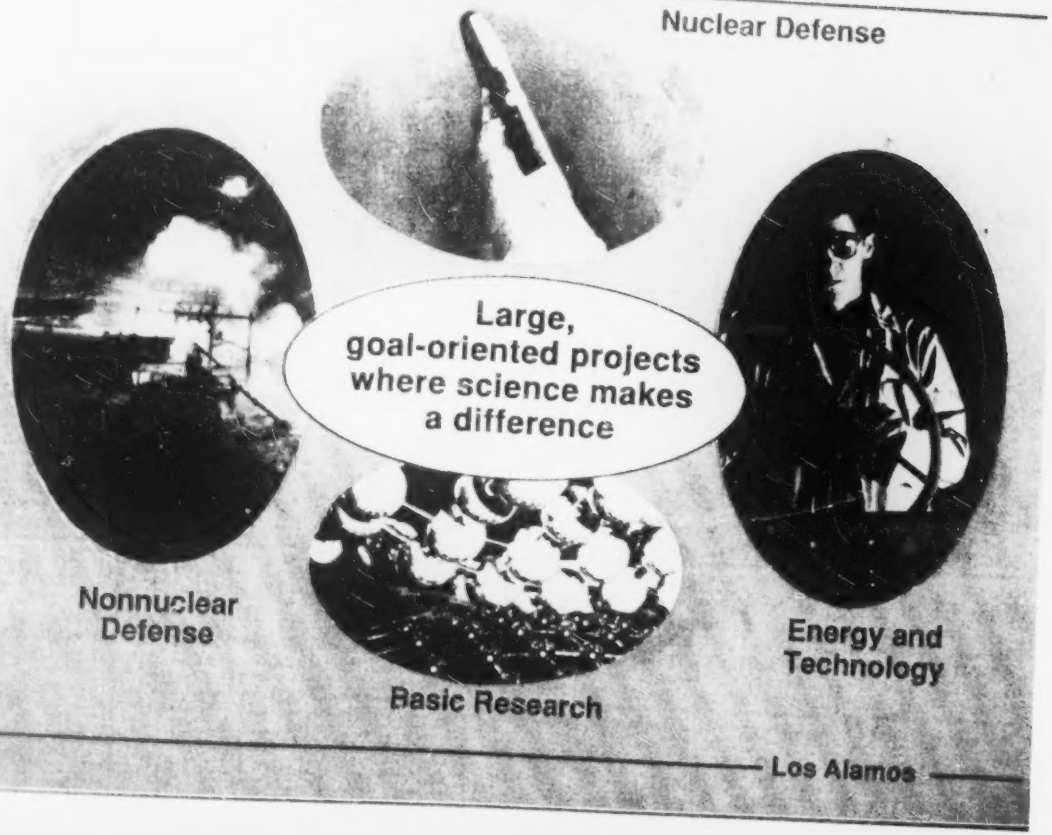
# SDI FREE-ELECTRON LASER PROGRAM OFFERS POTENTIAL SPIN OFF: XUV PHOTOLITHOGRAPHY

- Route to renewed U.S. leadership in global chip market
- Unique U.S. strength in FEL
- Enables chip feature sizes <0.1 μm for ultimate large-scale integration




Los Alamos

## LOS ALAMOS: A MULTIPROGRAM LABORATORY FOR NATIONAL SECURITY



PURSUING STRATEGIC/CRITICAL TECHNOLOGIES

Senator BINGAMAN. Thank you very much. Senator Exon is going to ask some questions on the issue of the safety of nuclear weapons that relate to some of the items covered in the morning news, so let me ask questions on some other issues for a minute. One of the things that you referred to, Dr. Hecker, is the importance of identifying so-called strategic technologies or critical technologies and then concentrating the enormous resources of our laboratories in those areas.

We have tried through the Department of Defense, in conjunction with the Department of Energy, to have a better definition of what those technologies are, with the reports that have been done last year and then again this year. And we now have the President's science advisor in the Office of Science and Technology Policy putting together a national panel to identify a common list for both defense needs and non-defense needs, a common list of the technology areas where they believe we need to excel during this decade. That report will come out sometime this fall.

My question to you and also to the other two panel members is what do you see as the proper role for Department of Energy weapons labs in helping to pursue those? We had some testimony from Charles Hertzfeldt earlier this week where he was saying that in the Department of Defense they are trying to identify a way of allocating responsibility somewhat among defense labs for those, so that everybody would not be responsible for everything, but they would try to focus some of the responsibility in particular areas in particular labs. Does that make sense in the Department of Energy as well or what is the proper role for the Department of Energy laboratories in pursuing these so-called critical or strategic technologies?

Dr. HECKER. It is a little more difficult to sort out and separate the responsibilities in the Department of Energy laboratories, just because the size of the labs is substantially different. We all represent essentially $1 billion of your investment a year, and 8,000 or so full-time equivalent employees. The Department of Defense labs, of which there are 73 of so, tend to be much smaller and their expertise is focused much more narrowly. And so it would make more sense there to go ahead and to separate what the responsibilities are. We have these more global capabilities, and I think it would be more difficult.

But in terms of the role that we could play, as I have testified in front of your committee after the first critical technology plan, I think we can concentrate on a few of the technologies that are extremely critical, that we know that year after year they will be there and they will not change necessarily as a result of today's list of requirements in the Department of Defense, technology such as computing. It has been important for five decades and we know it is going to be important for another five in areas such as advanced materials and others. So the important aspect that we can bring to the table is in those areas where you need continuity, where you need to continue scientific horsepower. That is one where I believe we can play a strong overarching role and then also be tied into

the more specific critical technologies within the Department of Defense to be sure that we do some good.

Senator BINGAMAN. Dr. Nuckolls, did you have a comment?

Dr. NUCKOLLS. I certainly strongly support Sig's view of this. I really commend him for bringing up this concept of the laboratories' getting involved in critical technologies, and I think his viewpoint about how we should be involved, of the multidisciplinary character of the lab and how they differ from Department of Defense labs is excellent, and I support what he said.

Senator BINGAMAN. Dr. Narath?

Dr. NARATH. I would like to make two points. First of all, I would not favor assigning specific, call it lead responsibilities to particular labs, essentially for the reasons already stated. But let me also introduce the notion that it is important that we build on established strength and in the case of the weapons laboratories, you already have significant strengths and ongoing programs in a number of the technology areas already mentioned.

For example, at Sandia we have significant work under way in the area of massively parallel computing, advanced materials. We have a very large microelectronics program, particularly in the area of the compound semiconductors. I think the Nation benefits by enhancing programs that are already in place. Let us not start new things where competence currently does not exist. Let us build on what is there.

Now, the second point to make is while we are developing these technologies let us be careful to connect them up with the private sector because if the Government simply generates technology in government laboratories and does not concern itself with how that technology subsequently gets transferred into the private sector, I do not think we are going to go very far in developing an industrial base, which ultimately will have to produce these things. So it is building on strength and making sure that adequate connections are maintained with industry throughout these efforts.

### FOREIGN TECHNOLOGY DEVELOPMENT

Senator BINGAMAN. There is another area I wanted to ask about. Historically the laboratories and the Department of Energy research activities have been focused on national defense needs, and accordingly the cooperative work with our allies has been pretty circumscribed. Some of it has occurred. But I am concerned and I have expressed this to several of you at any rate, Dr. Hecker and Dr. Narath, that we do not have adequate capability in the Department of Energy or anywhere in the Federal Government to monitor development of technology in foreign countries and to involve ourselves cooperatively with that development. I know there are some exceptions. I know that Los Alamos does have a person who has finally been cleared to go participate in the superconductivity research activity or project in Japan, but it seems to me there is far too little of that.

I would be interested as to your thoughts as to whether I am right about it, and if there is too little of it, what do we need to do either at the Government-wide level—I have a bill that has been referred to the Committee on Commerce, to set up a Foreign Tech-

nology Monitoring Office in the Federal Government, but it is not in the Department of Energy and it is not in the Department of Defense. I am not sure exactly what the solution is, it just seems to me that there is a need here which needs to be addressed. Any comments?

Dr. NARATH. I do not consider myself an expert in this area, but let me just comment that as the pace of scientific and technological development increases outside the United States, it clearly becomes more important for us to track what others are doing. We need to remind ourselves that the Japanese built a very strong technologically-oriented economy without first having invested much of anything in basic science or fundamental technology development. They did it by adapting what they saw us doing. Now that there are more players in science and technology, we should do what others have done traditionally, that is, benefit from what is done, wherever the developments take place. Now how we make these connections, build those bridges, I do not pretend to know in detail, but the need for these bridges, need for encouraging information flow from outside into the United States is clearly of great importance to us.

Senator BINGAMAN. Dr. Hecker?

Dr. HECKER. I would certainly agree with Al's comment and make the additional point in terms of what to do about it. You mentioned potential legislation and certainly we need to track what goes on in the foreign countries much better than we do now.

But we need to do more than just track and so we have a bit of a cultural problem to overcome as far as I am concerned, what I would call the arrogance of American science and engineering, is that we thought everything in the world that is important gets discovered and developed here. And of course, we found out in technology that that is not true. And so what we need to do is not just to send one or two people to track, we need to do what the Japanese did and that is to send our scientists and engineers to spend significant time on their soil, working with their people, bringing back the technology. It is clear that we still lead in science, but they lead in many areas in technology.

That is one of the reasons why we have one of our scientists who was admitted to be able to participate in this ISTC, the International Superconducting Technology Center, in Tokyo where there are 50 Japanese firms represented by two scientists each, to develop superconducting technology. We were fortunate to be able to get him to have a year's stay, and I hope that he comes back with a lot of knowledge about technology. That is what we need to do more of, the labs need to do it, the companies need to do it, and we need to recognize that there is a source of knowledge, technology, that we can benefit from.

Senator BINGAMAN. Senator Exon.

### 8-INCH ARTILLERY SHELL

Senator EXON. Mr. Chairman, thank you very much. I listened with interest to your excellent testimony. Let me start off with something of major importance right now. I assume that each of

you have had an opportunity to at least look at the story that appeared in the Washington Post this morning?

Dr. HECKER. Yes, indeed.

Senator EXON. I also understand that all three of you will be available for the closed session this afternoon, is that right?

Dr. NARATH. Yes.

Dr. NUCKOLLS. Yes.

Dr. HECKER. Yes.

Senator EXON. We appreciate that very much because your counsel and advice are tremendously important. I do want to ask you some questions now, and I recognize that we cannot get into classified matters that will be handled in the closed session. But we do need your candid advice and I think that as much as possible we have to handle some of this in open session. Let me begin by asking you questions about the 8-inch artillery shell. Are each of you satisfied with both the current safety of that 8-inch artillery shell, as modified, and with the speed with which those safety actions were implemented once it was known that there was a problem?

Dr. NUCKOLLS. Since it is our shell, let me answer for that. This is a problem that I became aware of within a few months of becoming director of the laboratory.

Senator EXON. Which was when, Doctor?

Dr. NUCKOLLS. I became director in April 1988 and became aware of this a few months later.

Senator EXON. That is when I first became aware of it, in 1988.

Dr. NUCKOLLS. Originally I became aware of this problem in computer calculations. We immediately went out and did experiments which verified this. Then we launched, by the standards of today, a crash effort to go out and fix these things, which happened in a period of a few months and in which many of our laboratory people participated with the teams in the field. So I think there can be no question about our response in this matter. It was overwhelmingly vigorous and time urgent and successful.

Senator EXON. Thank you. I want to say for the record that as chairman of the Strategic Subcommittee, when this was first brought to my attention, we worked very closely with the Department of Energy and others to see that this was followed up on promptly. And just for the record, I think you can confirm this in open session now that it is out, that we moved very aggressively in the first instance to take care of the problems for those artillery shells that were located in overseas bases, and then we moved aggressively in a relatively short period of time to correct the problem here in the United States. Is that correct?

Dr. NUCKOLLS. That is correct.

### SRAM–A WARHEAD

Senator EXON. Let us move then to another matter, the SRAM–A warhead. We all recognize that the SRAM–A system is nearing the end of its useful life, and that is why we are working on follow-ons. Certainly, the SRAM–A warhead was designed long before the current standards were imposed. One solution on the horizon is that the SRAM II and its new warhead, both of which are being actively developed, will satisfy any concerns or shortcomings with regard to

safety that we might have or have had on the SRAM-A. Is that an accurate statement? Who wants to answer that one?

Dr. NARATH. Well, I generally agree with that statement. The SRAM II W89 warhead is being designed with all of the currently known safety technologies and does meet existing standards.

Dr. NUCKOLLS. That again is a Livermore warhead, and Dr. Narath's statement is certainly true. The issue here is not the existence of a replacement, but how rapidly the replacement will actually be made. This is a problem that goes back in this area for some years.

### TRIDENT II WARHEAD

Senator EXON. I want to ask each of you this question because it is an extremely important one and has to do with the Trident II warhead. Are you satisfied that this weapon is adequately safe in its current configuration, or is there reason to reconsider the current warhead design, which I understand does not contain insensitive high explosives? What are your feelings on this and what are your recommendations?

Dr. HECKER. Let me tackle that one first since that is a Los Alamos design. Yes, I do feel that the W88 warhead on the Trident II D5 does meet today's safety standards. It met the safety standards at the time that we designed it, got it approved, and it still meets the safety standards of today. So I personally feel that, yes, adequate safety is taken care of.

Now, safety is a combination of both design and technology on the one hand and operational aspects on the other, and it was the combination of those two which led to the decisions early on to use conventional high explosive. From the standpoint of the deployment of the Trident II D5, I think the safety is there to continue with that deployment. Are we looking at future options to replace the conventional high explosive with insensitive explosive? Yes. That is part of the job that we continuously do, to always look at our systems and look at those upgrades.

I think today, particularly since we have a much better understanding of nuclear weapons design than essentially a decade ago when this was designed, since we have a better understanding of insensitive high explosives, since at that time it was still quite new, I think we would probably be able to do significantly better in terms of trade-offs of insensitive and conventional explosive. However, again, let me repeat that I feel it is adequately safe today. There are some concerns that we have as far as transportation, but there is no intent to do air transportation of the Trident II D5 W88 warheads. So with that combination, I feel that adequate safety is there.

Senator EXON. Dr. Nuckolls?

Dr. NUCKOLLS. I would agree with Sig. I think it is very important that the United States continues the deployment of the Trident II system with the W88 warhead, as scheduled. I think that we ought to move expeditiously to put these improved features that Sig talked about into a safety mod, and hopefully if we do that fast enough we can finish the deployment with even safer warheads than we already have. And then I think we should seriously consid-

er going back and replacing the ones that we have already deployed with the even safer ones. I think with the world that we are moving into, we need increasingly higher standards of safety.

What was good enough 10 years ago is not going to be good enough 10 years from now. As Sig said earlier in his testimony, a safety accident could threaten the deterrent, and I think the laboratories are moving aggressively in this area. We should continue to do so, and it is part of our responsibility to see that the new technologies that we are developing actually get put into the stockpile.

Senator EXON. Dr. Narath?

Dr. NARATH. To my knowledge, there are no safety concerns on the W88 that have not been understood for a long time. At the time that the design decisions were made on the W88 warhead, there was consideration of the advantages of insensitive high explosive against the military disadvantages that would result from such a choice.

It seems to me that the laboratories can only offer options. Clearly, the insensitive high explosive option from a safety standpoint would have been the preferable one at that time. There were penalties associated with it from the point of view of performance of the system. Ultimately, once the facts are known the trade-offs and the final decision as to which way to go has to be made at a very high level within the Department of Energy and the Department of Defense, and those decisions were made in that manner.

I also believe that with proper operational procedures, the W88 system is adequately safe. I also believe that were we to make those decisions today, we probably would make that decision differently. We live in a very different world today from that which we faced at the time of the original decisions.

Senator EXON. So if I can sum up in lay terms, what you are saying is that if we were developing the W88 warhead today rather than when we did it, we would build in what you say will be built into the newer warheads.

Dr. NARATH. I believe that there are no absolutes in safety. There are always ways of doing something more safely, and, as technical understanding advances, new options for creating high levels of safety appear. But we cannot wait forever to make design decisions. I was not part of the decision-making process back in those days, but I believe that the decisions were made in good conscience and with due consideration of all the known facts.

### SAFETY OF W88 WAPHEAD

Senator EXON. It is true that safety is a term that is tough to define. Let me ask you this question to try to and get your best professional judgment on this as to how safe the W88 is now. If 100 were the ultimate in safety, what do you think the new improved W88 would be? And so that we can put this in some perspective, what would that measure in the terms of the warhead that we now have? Give me some basic professional judgment figures on the relative terms of safety on the parameter that I have outlined.

Dr. HECKER. You see us all hesitate on that——

Senator EXON. I heard that.

Dr. HECKER. It is very difficult to quantify it as specifically as you have because the question that you asked is the question about the warhead, and the overall safety of the system is a combination of the warhead, the environment that it is in, the missile, all of the rest of the transportation, and the actual environment in the submarine. It was the combination of all of those things, the reasonably benign environment in a submarine and the record of other warheads in that environment, that led to the early decision to say that the increment in additional safety that you get by putting insensitive high explosive in was not worth the decrement for military performance. That was the decision that was made principally by the Department of Defense. So it is difficult to put a specific number on that. I think today in the environment that we talk about, much of it is just that there are very different overall criteria for safety and so one might indeed come to a decision to do it differently, but I just have a difficult time to put a number on it, and I cannot answer your question as simply as you put it.

Senator EXON. I do not mean to put it simply; I am trying to get it in terms that can be easily understood. I know the mixture of this is significantly different, but for example, when I go hunting with my shotgun I am 99.9999 percentage sure that when I put the shell in the gun, if I put the shell in the gun right and if I have it in the chamber and if I pull the trigger, it is going to fire and it is going to fire safely. Can you not give me any percentage figures at all? I would hope that if 100 percent is the ultimate in safety, that the present combination of the warhead and the way it is handled and the way it would be fired would not be far down as a percentage figure. I would assume it is higher than that. You cannot even give us a ballpark figure?

Dr. NARATH. Let me suggest that the difficulty with the question and the reason the answer is so hard to come up with is that the answer is very scenario dependent. If I consider your shotgun, your hunting analogy again, what you have described is a very benign scenario. I could probably think of some scenarios in hunting in which the probability of injury would go much higher.

If during the life of the nuclear warhead the environment remains as benign as it is in your hunting environment, then I would say the system is absolutely safe. The question is, what kind of scenarios can you dream up that would create an exposure which would subsequently lead to a hazard?

Dr. NUCKOLLS. I think that puts it exactly right. The way accidents happen, is the scenario happens that you did not anticipate, and the nature of all probabilistic assessment, which is what we are talking about here, is that in the end it depends on your having identified all possible scenarios and how the system would respond to each of those scenarios. And of course, we know that no one can say that he has not overlooked something, particularly when you get down to extraordinarily low accident probabilities, which is what we are talking about here, something far beyond 90 to 95 percent.

SRAN–A ALERT POSTURE

Senator EXON. Well, thank you for trying. I am only trying to get some clarity and sound reasoning behind some of these things. We will be pursuing this a little bit further in closed session with you and the others this afternoon.

Let me ask one last question if I might, Mr. Chairman. Let us return to the SRAM–A for just a moment. With the risks that are associated with the SRAM–A that we have identified and spoke of some, in your judgment, should we consider taking the SRAM–A off our alert bomber force? By that I mean putting it in storage and if we would need that at some time in the future we would have it. Or are you satisfied that the current safety of the SRAM–A is adequate for continued operational use as it is being used now until it is replaced by the SRAM II?

Dr. NARATH. Again, we are dealing with a decision that involves trade-offs between safety and military utility, or military need. And I do not claim to be competent to make the military judgment. Speaking for myself as a private citizen, I would feel a lot more comfortable if that system were taken off alert and put into a posture, perhaps a 4-hour alert posture, that would reduce the exposure that the system currently suffers in terms of accident probabilities. But I am not the one to make that decision.

Senator EXON. What you are saying is that the Commander in Chief of the Strategic Air Command Headquarters would have to make that final decision, given what he perceives the threat to be, is that right?

Dr. NARATH. I believe that the easing of tensions in the world today suggests that that question should be asked again. Do the national security needs of the Nation at this point in time, knowing what we do, require that we continue exposure of that system in a readiness posture? I personally would like to see the exposure reduced at this time.

Senator EXON. Thank you. Dr. Nuckolls?

Dr. NUCKOLLS. President Narath has stated my position very well, and I would agree with him.

Senator EXON. Thank you. Dr. Hecker?

Dr. HECKER. I also agree that we need to speak on the safety aspect of this, and as I was trying to say before, the safety is a combination of the technology and the operational environment, and that we have expressed our concern about the combination of those two for the 69. And so, very much as Al Narath said, I think it is time to reexamine those trade-offs, but we all have expressed our concerns and we continue to do so today.

Dr. NUCKOLLS. I would like to add one thing, namely, if somebody makes this trade-off and decides to leave it on alert, I think the country would be irresponsible if we did not move as expeditiously as possible to produce an alternative or to make an operational procedural change which would get it off of alert. And what I am worried about, having watched this thing for years, is that I do not see that kind of expeditious action happening when we make that kind of trade-off.

SAFETY OF OTHER SYSTEMS

Senator EXON. Gentlemen, thank you. Let me ask one final question to try to put this in perspective. Would you say that all of the nuclear inventory that we have discussed here this morning by direct reference could be declared as safe compared with the problems that we identified and corrected with the artillery shell? None of these systems border on the concern and the alarm that took place in your community when you discovered what you did on the artillery shell?

Dr. NUCKOLLS. Well, if there were such a thing we would certainly move expeditiously to fix it, I can tell you that.

Senator EXON. I am asking you a very straightforward question, gentlemen. What I am trying to do is to get to the bottom of the legitimate concern that I and others have had. Now that it is out in the open media, there is going to be alarm unless we can somehow get some assurances. I do not want to give false assurances. You certainly have identified here that there was obviously some concern, Dr. Nuckolls, in your mind and in your laboratory with regard to a safety concern with the artillery shell, is that right?

Dr. NUCKOLLS. That is right.

Senator EXON. My question once again is, do your concerns for any of the other systems that we have identified here this morning, or any other systems that we have not identified, approach the concern that you had with regard to the artillery shell?

Dr. NUCKOLLS. The W69.

Senator EXON. I beg your pardon?

Dr. NUCKOLLS. The SRAM.

Dr. NARATH. But he is asking—may I?

Senator EXON. So the SRAM is as potentially dangerous as the artillery shell?

Dr. NARATH. If you would permit me.

Senator EXON. Yes.

Dr. NARATH. I believe the question needs to be clarified. As I understand it, the question is, the process or the mechanism that was the matter of concern in the case of the shell: does such an accident mechanism or possibility exist elsewhere?

Dr. NUCKOLLS. Or one that is even more severe.

Dr. NARATH. But I believe did the question not refer to a specific accident mechanism, namely one that operated——

Senator EXON. Call it an accident, call it something that you have not at the present time identified or thought of. I am trying to be very simple and very straightforward, and I am simply saying that I hope that the SRAM-A and the other systems are in your judgment much more secure and much more safe under any envisioned scenario or imagined scenario than is the artillery shell.

Dr. NUCKOLLS. Okay, the 88 is; the SRAM is not.

Senator EXON. The 88 is, and the SRAM is not in your opinion?

Dr. NUCKOLLS. That is my opinion.

Senator EXON. Do you agree with that statement, Dr. Hecker?

Dr. HECKER. Indeed. I would say that we have continued to express our concern about the SRAM-A and so that is certainly at the top of my list. Right now the artillery shell is very safe, and

the W88 would also be way down on my list. It is no where near that concern. The SRAM-A is a significant concern.

Senator EXON. Now we are getting some help, thank you. That helps clarify it. I hope you feel that I have not just been badgering you. I am just trying to get some answers. Doctor, do you have any further statement on that?

Dr. NARATH. I would like to add something, not addressing the specific concerns you have raised, but addressing the safety issue more broadly. I hope you understand that as I indicated in my testimony there is a very close relationship between the laboratories and the Department of Energy. Both the laboratories and the Department of Energy have had nuclear weapons safety uppermost in their minds for many, many years now.

There is no motivation whatsoever within the laboratory, within any of the laboratories, or the Department of Energy, to cover up any problems if and when they are discovered. I take great pride in the fact that as a community we have reacted expeditiously each and every time that a concern has been raised. I think our record is very good on that point, and we will continue to operate exactly in that manner. I might also say that Admiral Watkins personally has involved himself in the nuclear weapons safety issue in a way that no predecessor of his has in my recollection.

Dr. HECKER. If I may just make one additional statement of that nature because I think it is important as to how nuclear weapons safety is played out.

We have two nuclear design laboratories, Lawrence Livermore and Los Alamos, and typically one of us gets an assignment for a weapon; as you heard, the artillery shell in this particular case was Livermore and the W88 was Los Alamos. There is a strong sense of peer review. When the artillery shell problem was found, it was people at Los Alamos that worked in calculations as well. We peer reviewed the Livermore fixes, and the same as one is able to calculate better, the Livermore people were calculating the W88 safety. And we were responding to that, and Sandia plays an overall role in watching over all of us. So there is a significant amount of peer review especially addressed to this issue of nuclear weapons safety.

Senator EXON. Thank you very much, gentlemen. I know you are in a tough spot, but we are in a tough spot too and I just think we should try and get some of these things out in the open a little bit more than they are. Senator Bingaman, thank you very much.

### WEAPONS SAFETY REVIEW COMMITTEE

Senator BINGAMAN. Let me just clarify my understanding of what we have been saying here. The morning paper made it clear that the issue of the SRAM-A had been raised, that Secretary Watkins became quite concerned about it, that those of you here had discussed it, that the upshot was the appointment of a new weapons safety review committee under the Department of Energy's control, and that that committee has made some recommendations. But I do understand that what is being said here is that there has not been adequate action in response to the problem as yet.

Dr. NARATH. Well, in regard to the nuclear weapons safety committee, which was established last year and which Admiral Barr

chairs for the Department of Energy, it is currently conducting a detailed study of the SRAM-A W69 safety question, has for some time, and will conclude this examination in a very short time. It is trying to quantify the probabilities associated with the system exposure to the maximum extent possible, and it is attempting to identify alternative deployments that would reduce the exposure. So the comment I wish to make is that the safety committee, which the Department of Energy was in large part responsible for forming, has examined the W69 issue for some time now.

Senator BINGAMAN. But a decision by that committee or recommendation to the President by that committee is expected soon?

Dr. NARATH. It is about a month away.

Senator BINGAMAN. Okay.

Senator EXON. Senator Bingaman, could I just correct or clarify one point, I believe that the committee that was appointed by the Secretary of Energy was originally as a result of the concerns about the artillery shell, but they were asked to continue.

Dr. NARATH. That is a different committee.

Senator EXON. Well, the committee that the Senator just referred to, they are the committee now taking a look and about to make recommendations with regard to the SRAM, is that right? Was not that committee also activated when the matter of the artillery shell came up or not?

Dr. NUCKOLLS. I do not think so.

Senator EXON. It was not?

Dr. NARATH. The committee I am referring to is a standing committee. It reports to the nuclear weapon council and provides—it is chaired by the Department of Energy with membership from the Department of Defense and the Department of Energy and it has an independent oversight responsibility over safety matters. It is obligated by its charter to report to the Secretaries of Energy and Defense on an annual basis. It is preparing its first annual report at this time, and in addition it is carrying out a number of specific weapon systems studies, one of which is the W69 SRAM-A.

Senator EXON. That committee, did it or did it not take a look at the artillery shell?

Dr. HECKER. There was undoubtedly some overlap in membership because there are only so many nuclear weapons experts around, but I do not believe that it was specifically meant to be that same committee. It is more of a task force looking at a specific problem. There was one for the artillery shell. There is one now for the SRAM-A. I think the connection is not necessarily direct.

Dr. NUCKOLLS. I must say concerning your inquiry about this committee, I think this committee is potentially a very needed and powerful force in the safety equation, but there is a point I want to make. I think that nuclear weapons, like nuclear reactors need to be, by design, made inherently safe, not that operational procedures are not important. Operational procedures are important, just as when you handle your shotgun. But the shotgun ought to be designed so it is safe unless you do something really crazy with it, and I think the laboratories have to make that possible and see that it gets implemented in the stockpile in the future. That is going to cost money and so Congress and the country have to be

willing to spend money to change the stockpile and some of that still lies ahead of us.

BALANCE BETWEEN SAFETY AND READINESS

Senator BINGAMAN. Since the judgment as to whether or not a weapon is safe always depends on this balance between the increment in safety and the decrement in readiness or yield, I would gather that what you are saying is that the change in the threat and the change in the level of tension that exists in the world would dictate a review of the weapons in the stockpile, virtually all the weapons, to determine whether there is an appropriate balance still between those two.

Dr. NUCKOLLS. There is one more factor in the equation and that is the laboratories continue to develop new technologies which make that trade-off even easier to do.

Dr. HECKER. I think this standing committee that has been set up is exactly a recognition of what you just said. It is a recognition that the world has changed that way and that standing committee will play a significant role in looking at those trade-offs, the military trade-offs versus the safety.

Senator BINGAMAN. Okay. Thank you all very much. Yes, go ahead Senator Exon.

Senator EXON. Let me just lighten this up a little bit. Getting back to the shotgun, I do wish that you would spend a little bit of time on finding a shotgun that shoots straight. I have always had trouble with that. [Laughter.]

Senator BINGAMAN. Thank you all very much. We appreciate it. This hearing is adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR EDWARD M. KENNEDY

TECHNOLOGY TRANSFER

Senator KENNEDY. Dr. Narath, what restrictions, if any, have existed in the past or exist currently on the transfer of Sandia-developed technology to Bell Laboratories and the parent AT&T company? Please provide a description of the arrangements governing AT&T's access to and utilization of Sandia-developed technology.

Dr. NARATH. Arrangements governing AT&T's access to and utilization of information arising in the course of work at Sandia are set forth in the prime contract between AT&T and the Department of Energy.

*Sandia-developed technology*

AT&T may use Sandia-developed technical information for private purposes provided that any contract obligations to report the information to the Department of Energy have been met. AT&T may not use technical data first produced under the Sandia contract for sales to the Government unless the data is available to the public.

AT&T has a non-exclusive license to use patented Sandia inventions. If AT&T desires exclusive license or assignment of a Sandia patent, negotiations must be conducted by the Department of Energy. For companies other than AT&T, Sandia may conduct patent negotiations directly.

AT&T is subject to national security laws regarding access and need to know.

*Department of Energy and third-party information*

AT&T may use Department of Energy internal information only for the purpose of enabling performance of the prime contract. AT&T is expressly prohibited from using Department of Energy internal information for any private purpose unless the information has been released to the public. AT&T may not submit an unsolic-

ited proposal to the Government based on such information for 1 year after release of the information to the public.

AT&T must follow any written restrictions on the disclosure and use of third-party proprietary information furnished to Sandia in performance of the contract.

EXTENDED STOCKPILE LIFE

Senator KENNEDY. Dr. Narath, in your prepared statement, you observe that Sandia's "efforts will be guided by the realization that a stockpile designed for peacetime must increasingly stress safety, command and control, reliability over an extended stockpile life, and broad mission applicability." I would have thought that safety and command and control attributes would be equally or even more important in "wartime," when the weapons are on high alert status and exposed to greater hazards than a "peacetime" deployment. And why are the attributes of reliability over an extended stockpile life and broad mission applicability more important now than they were 10 or 20 years ago? Please explain your statement.

Dr. NARATH. As I said in the paragraph immediately preceding the paragraph from which you quoted, "the deterrent value of the stockpile must be sustained; safety must always be of paramount importance; reliability and quality must be consistently high; and command and control must be assured at all times."

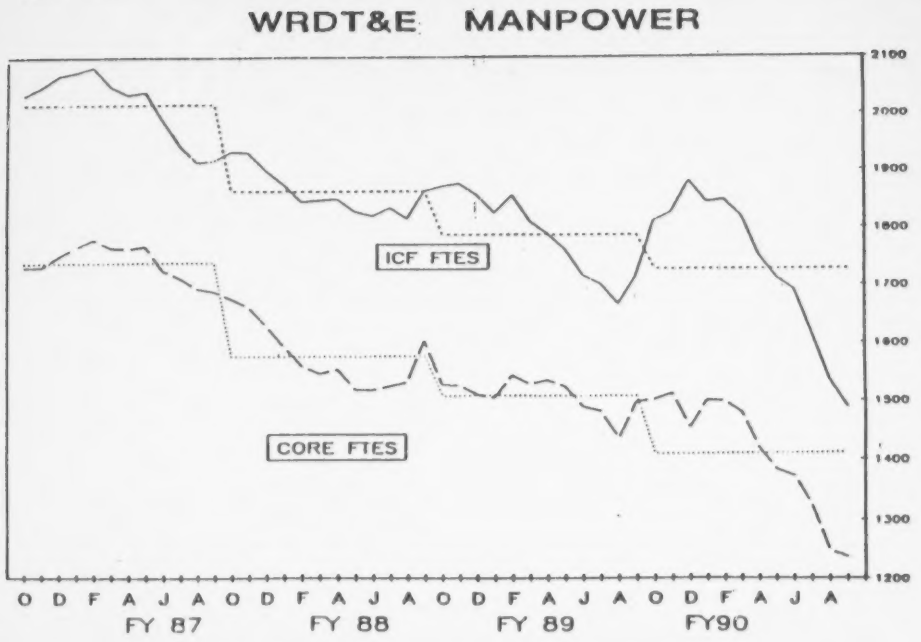
The points I was trying to emphasize relative to a peacetime stockpile are: with less threatening times, there will be even less public acceptance of risk with respect to nuclear weapons (hence, all weapons should have enhanced safety features which can only be accomplished with congressional support), reliability must receive continued attention since weapons will likely remain in the stockpile for longer periods of time (the average age of a stockpiled weapon in 1961 was 2.4 years—today it is 13), and while we will most likely have a much smaller stockpile in the future, those weapons we do have will need broad applicability since we would still like to be able to respond with a wide variety of possible deployment/employment actions.

WRDT&E

Senator KENNEDY. Dr. Nuckolls, you testified that "during the past few years, the budget of the Department of Defense research and technology development program has declined substantially. Since 1985, the Livermore Laboratory has lost nearly 25 percent of its uniquely trained and skilled weapons research, development, and testing (WRDT&E) personnel. This loss of personnel is projected to continue into fiscal year 1991. The Department of Energy research and technology development program is substantially underfunded." I am interested in understanding Livermore's WRDT&E effort in its historical context. Please provide the committee with a table which shows Department of Energy Defense Programs support for weapons RDT&E (including NDEW) at Livermore since 1960, measured in terms of FTEs and constant fiscal year 1991 dollars.

Dr. NUCKOLLS. Attached is the table you requested.

Note that my comments during the May 23 testimony on the weapons research development and testing personnel apply specifically to the erosion of the laboratory's core program (including NDEW). A monthly plot of core program manpower (similar to the plot shown in May) through the close of fiscal year 1990 is also attached to reemphasize my concern.




Senator KENNEDY. Dr. Nuckolls, please provide charts or tables showing full time regular employment at Livermore, the overall annual budgets for the laboratory, and the funding mix between defense and non-defense programs since 1960 in constant fiscal year 1991 dollars.

Dr. NUCKOLLS. Attached is the table you requested.

Note that my comments during the May 23 testimony on the weapons research development and testing personnel apply specifically to the erosion of the laboratory's core program (including NDEW). A monthly plot of core program manpower (similar to the plot shown in May) through the close of fiscal year 1990 is also attached to re-emphasize my concern.

# HISTORICAL DATA IN RESPONSE TO SENATOR KENNEDY

| | | | WRDT&E | | LLNL Operating Costs (K$) | | | |
|---|---|---|---|---|---|---|---|---|
| Fiscal Year | Core FTEs | ICF FTEs | Total FTEs | Costs K$ | Total Defense | Non-Defense | LLNL Total | Total LLNL FTEs |
| 1991 | 1250 | 298 | 1548 | 336000 | 770700 | 243600 | 1014300 | 7963 |
| 1990 | 1412 | 316 | 1728 | 384358 | 805302 | 229564 | 1034866 | 8128 |
| 1989 | 1504 | 274 | 1778 | 419616 | 816458 | 235518 | 1051976 | 8247 |
| 1988 | 1576 | 286 | 1862 | 437743 | 796346 | 232734 | 1029080 | 8219 |
| 1987 | 1740 | 278 | 2018 | 473478 | 844891 | 207535 | 1052426 | 8280 |
| 1986 | 1571 | 287 | 1858 | 435393 | 773518 | 239144 | 1012662 | 8020 |
| 1985 | 1546 | 301 | 1847 | 443968 | 719832 | 221598 | 941430 | 8063 |
| 1984 | 1553 | 290 | 1843 | 423834 | 647163 | 226484 | 873647 | 7776 |
| 1983 | 1581 | 296 | 1877 | 412965 | 546126 | 202357 | 748483 | 7450 |
| 1982 | 1498 | 315 | 1813 | 406868 | 551493 | 185597 | 737090 | 7370 |
| 1981 | 1336 | 354 | 1690 | 391808 | 526242 | 181957 | 708200 | 7236 |
| 1980 | 1225 | 362 | 1587 | 353249 | 477438 | 200462 | 677900 | 7017 |
| 1979 | 1279 | 355 | 1634 | 364446 | 489352 | 198898 | 688250 | 6866 |
| 1978 | 1417 | 354 | 1771 | 409263 | 512752 | 188736 | 701488 | 6721 |
| 1977 | 1451 | 281 | 1732 | 393825 | 459892 | 180484 | 640376 | 6295 |
| 1976T | 1423 | 259 | 1682 | 109603 | 125360 | 44726 | 170086 | 6008 |
| 1976 | 1427 | 244 | 1671 | 352236 | 390616 | 142756 | 533373 | 5726 |
| 1975 | 1464 | 230 | 1694 | 346658 | 378895 | 126390 | 505286 | 5555 |
| 1974 | 1780 | 280 | 2060 | 372403 | 384873 | 96377 | 481250 | 5213 |
| 1973 | 1977 | 254 | 2231 | 392475 | 404217 | 96242 | 500459 | 5420 |
| 1972 | 1992 | 173 | 2165 | 389539 | 403836 | 91119 | 494955 | 5182 |
| 1971 | 2210 | 137 | 2347 | 412240 | 423072 | 88040 | 511111 | 5359 |
| 1970 | 2431 | 48 | 2479 | 446858 | 459996 | 101357 | 561353 | 5745 |
| 1969 | 2463 | 36 | 2499 | 449737 | 456005 | 104547 | 560553 | 5719 |
| 1968 | 2322 | 36 | 2358 | 440045 | 451551 | 130702 | 582252 | 5633 |
| 1967 | 2270 | 44 | 2314 | 424612 | 433231 | 127509 | 560740 | 5561 |
| 1966 | 2302 | 40 | 2342 | 442603 | 447703 | 111564 | 559267 | 5410 |
| 1965 | 2355 | 48 | 2403 | 437812 | 438074 | 97002 | 535076 | 5326 |
| 1964 | 1886 | 44 | 1930 | 443436 | 447051 | 138992 | 586043 | 5307 |
| 1963 | 1886 | 8 | 1894 | 389421 | 387042 | 185431 | 572473 | 4807 |
| 1962 | 1680 | | 1680 | 390510 | 396094 | 170767 | 566861 | 4436 |
| 1961 | 1491 | | 1491 | 264518 | 267880 | 168252 | 436132 | 4291 |
| 1960 | 1515 | | 1515 | 242487 | 242487 | 137556 | 380043 | 4158 |

FY 1991 data are estimates based on HQ guidance.

All FTEs are "direct" FTEs.

Core FTEs include all effort on Weapons Research, Development and Testing.

ICF FTEs include effort on the Inertial Confinement Fusion Program.

Costs are given in FY 1991 dollars.

NUCLEAR WARHEADS

Senator KENNEDY. Dr. Nuckolls, you testified that, "as the number of nuclear warheads decreases, increased laboratory efforts will be required to ensure a stable and credible deterrent. This is easily seen in the limit. Were the stockpile reduced to a few warheads, assuring effectiveness and survivability would be extremely difficult. Hundreds of nuclear warheads could inflict catastrophic damage on the United States." What is the empirical or analytical basis for your observation that as the number of Soviet and United States nuclear warheads decreases, increased laboratory efforts will be required to ensure a stable and credible deterrent?

Does your observation apply equally to a stockpile of 2,000 to 3,000 weapons? Indeed, one can just as easily forecast the opposite effect—that as United States and Soviet nuclear forces are reduced, fewer warheads will be available for targeting against each side's strategic weapons launchers, increasing "stability" (as that term is usually employed in the arms control lexicon) without reliance on "increased efforts" by your laboratory to design new weapons.

Dr. NUCKOLLS. An increased level of effort by the laboratories will be needed to achieve the transition from our present stockpile to a much smaller stockpile and to manage that smaller stockpile. One cannot simply select from the present stockpile to make the smaller stockpile. Weapons which meet modern safety and security requirements are required for the future stockpile. These weapons must also be well-adapted to future testing restrictions—which means not only increased reliability (since fewer warheads and delivery systems will be available) but also greater modularity for use on several different deliver systems. These weapons should minimize waste generation and other ES&H problems in the Department of Energy complex, and they should make possible reductions in the size and operating costs of this complex.

As the risk of war with the Soviets decreases, the level of risk which the public is willing to accept in the safety and security of nuclear weapons is likely to decrease. These new standards are likely to require warhead designs which are significantly different than the ones employed today. As in other technical fields, our understanding of the safety of nuclear weapons continues to grow and requires changes to stockpiled weapons. See the Drell Report for a full discussion of these issues.

With a substantially smaller stockpile, greater effort must be devoted to technological surprise. Given the present large number and types of warheads, different kinds of delivery systems, and their different approaches to pre-launch survivability and reliable penetration to the target, there is reason to believe that our current deterrent is relatively resilient to technological surprise.

For instance, each leg of the Triad has different pre-launch survivability characteristics requiring distinct and separate technological advances on the part of the Soviets to successfully attack and destroy them. Thus, if a technological surprise occurs which renders one leg of the Triad vulnerable, the other two legs are likely to be immune to this development and continue to provide adequate deterrent capability.

As the number of weapons and weapon systems are decreased, it is likely that the resiliency gained though this type of redundancy will be reduced and our deterrent will become more vulnerable to technological surprise. The nuclear design laboratories must then increase their focus on advanced nuclear weapon systems.

Weapon system reliability will be another area of increased concern. While we have high confidence in the reliability of deployed nuclear warheads, we are unable, because of the cost of nuclear testing, to certify reliability by statistical testing. At the present time, diversity of warhead designs minimizes the potential for common mode failure which could impact large portions of the stockpile if it were comprised of only a few warhead types.

For example, our current SLBM force employs three different kinds of warheads while our land-based ICBM force employs four different kinds of warheads. These designs were roughly equally divided between each of the two design laboratories and reflect different design approaches.

As stockpile sizes decrease significantly, we will either have to maintain the current degree of warhead diversity or we will have to achieve even higher confidence in the reliability of the warheads remaining in the stockpile. These various considerations clearly do apply to a stockpile of 2,000 to 3,000 weapons.

Your comment, "that as United States and Soviet nuclear forces are reduced, fewer warheads will be available for targeting against each side's strategic weapons launchers, thereby increasing stability," is a valid one if the number of strategic launchers is not significantly decreased below the number of warheads. The single warhead, small ICBM is a system which typifies this approach to increasing stabili-

ty. It requires highly reliable warheads and does not address the issues of technological surprise and increased safety, security, and command and control for the future stockpile.

Senator KENNEDY. Dr. Nuckolls, in the context of your testimony cited above, what do you mean by "stable?" What do you mean by "credible?" What do you mean by "assuring effectiveness?"

Dr. NUCKOLLS. There are two kinds of stability that apply to our nuclear deterrent. Crisis stability is accomplished by sufficiently reducing first strike incentives, e.g., by configuring our forces so that enough would survive an adversaries' first strike to destroy the minimum set of targets necessary to deter the first strike. Arms control stability requires that our forces be configured so they do not provide an incentive to our adversaries to build larger forces.

Survivability plays a key role in maintaining both crisis and arms control stability. Survivability depends on our ability to anticipate technological developments that might render our deterrent vulnerable to an attack.

Effectiveness refers to our capability to destroy with high confidence the minimum target set necessary to achieve deterrence of nuclear and major conventional wars and to achieve required national security objectives should deterrence fail. This target set changes with time. As it evolves, new requirements are placed on the nuclear weapons design laboratories to develop technologies which meet the military requirements necessary to hold the target set at risk.

Credible includes the element of perception—both by our adversaries and by our leaders—that our nuclear forces could, with high reliability, accomplish their missions, and the perception by our adversaries that, if necessary, our leaders would and could employ these forces.

Senator KENNEDY. Dr. Nuckolls, is the "limiting case" you cite of a "few warheads" considered a reasonable—and therefore relevant—projection of the scale of nuclear reductions to be expected over the next decade or two? If not, does this affect your conclusion that increased laboratory efforts will be required?

Dr. NUCKOLLS. The limiting case of a few warheads I cited was only to illustrate the fallacy in the assumption that a smaller stockpile means smaller lab efforts and responsibilities. This fallacy is relevant and does apply as explained above to the projected case of a few thousand warheads to be expected in the next decade or two.

The size of the stockpile is determined by the requirements placed on the nuclear deterrent. The nuclear deterrent has been configured to deter both nuclear and large scale conventional conflict. The number and characteristics of the warheads in the stockpile are determined by the target list and targeting options. A substantial number of targets on the target list are related to conventional warfighting capability and do not scale with reductions in nuclear weapons.

If future reductions in the stockpile are assessed in terms of the desire to deter nuclear and conventional conflict, I believe a substantial number of warheads (in the thousands) will be required. The lower limit on the size of the United States stockpile is also likely to be set not only by the number of warheads in the stockpile of the U.S.S.R., but also the sizes of the stockpiles of other nuclear powers. This consideration will also dictate a likely lower limit of several thousand for the foreseeable future. As explained in answer to earlier questions, the case of a few thousand warheads does require increased laboratory efforts.

### WRDT&E

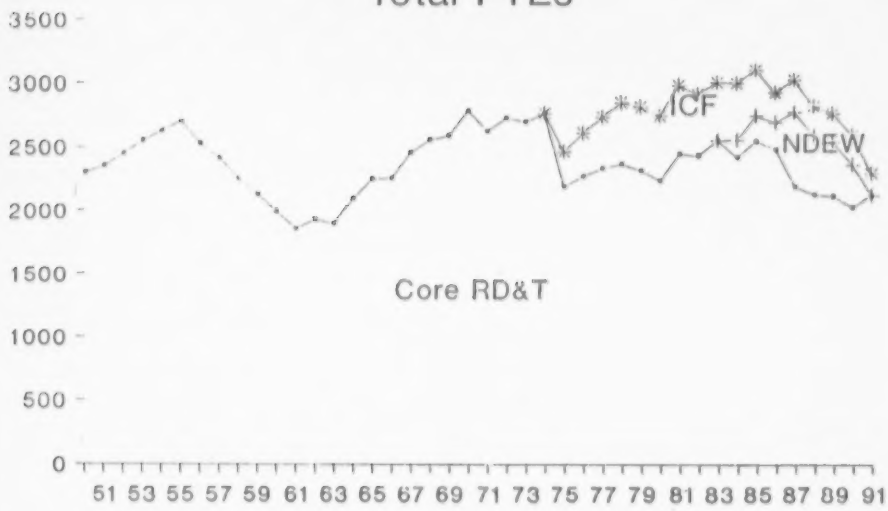
Senator KENNEDY. Dr. Hecker, you testified that the nuclear weapons technology base at Los Alamos has suffered a 25 percent loss in manpower in the past 5 years. I am interested in understanding the Los Alamos WRDT&E effort in its historical context. Please provide the committee with a table which shows annual Department of Energy Defense Programs support for weapons RDT&E (including ICF and NDEW) at Los Alamos since 1960, measured in terms of both FTEs and constant fiscal year 1991 dollars.

Dr. HECKER. See attached tables.

# Los Alamos National Laboratory

## Weapons Programs

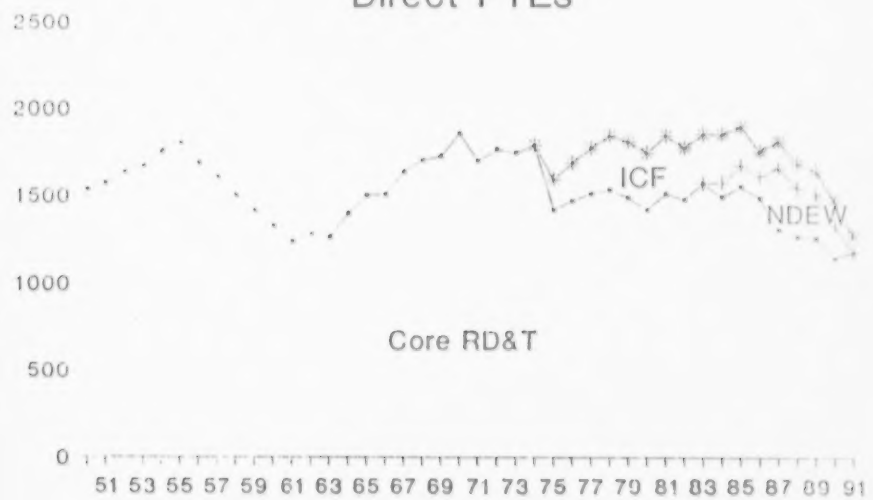
### Total FTEs



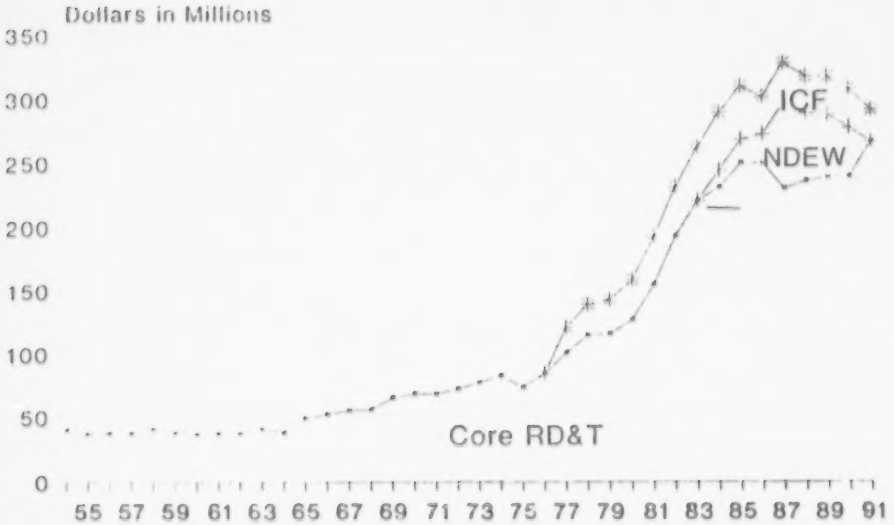

# Los Alamos National Laboratory

## Weapons Programs

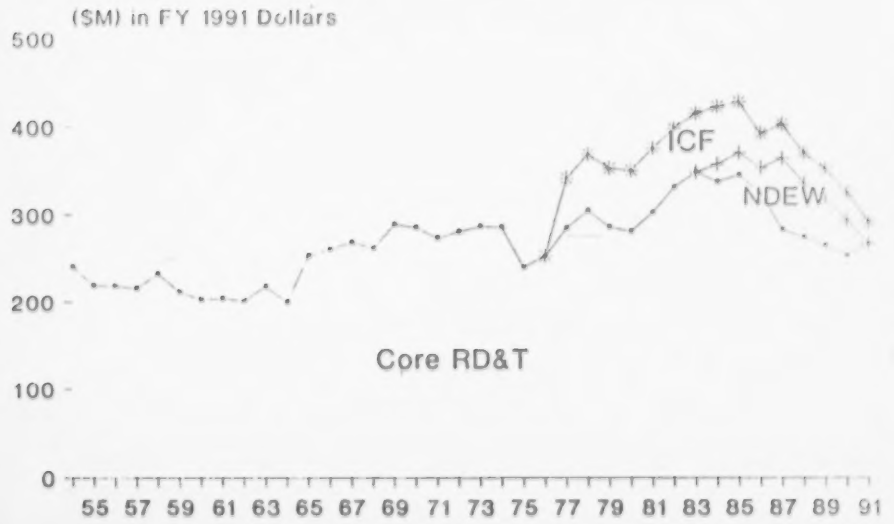
### Direct FTEs



# Los Alamos National Laboratory
## Weapons Programs

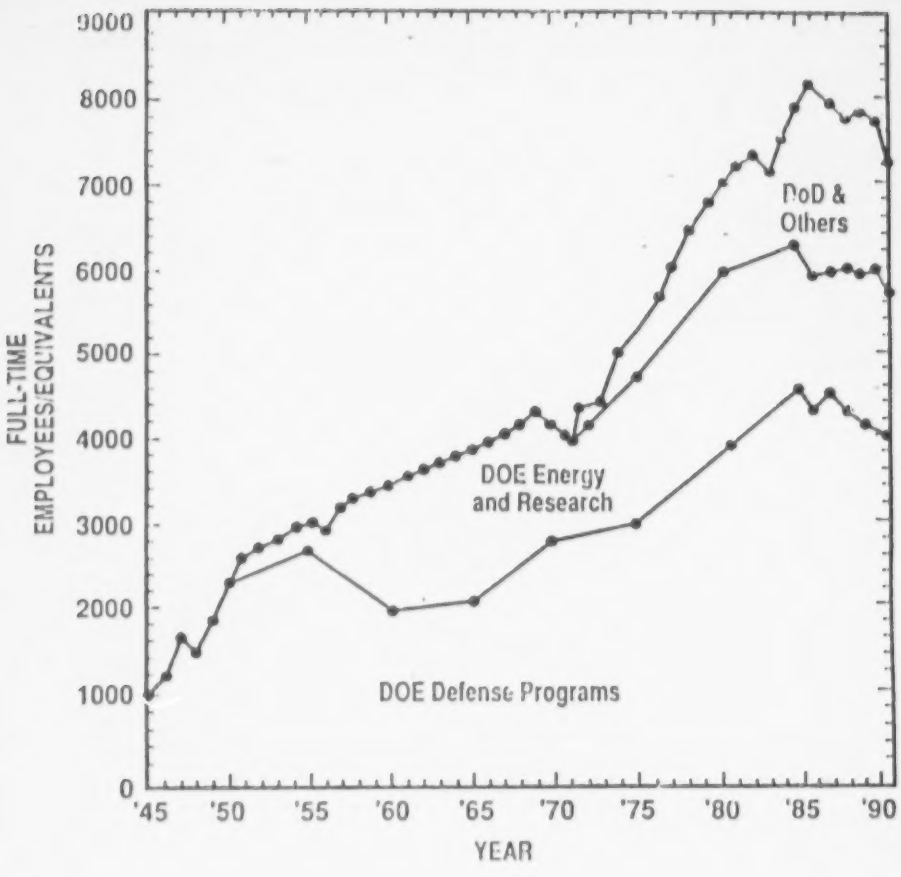



# Los Alamos National Laboratory
## Weapons Programs




**Senator KENNEDY. Dr. Hecker, please provide charts or tables showing total full time regular employment at Los Alamos, the overall budget for the laboratory, and the funding mix between defense and non-defense programs since 1960 (in constant fiscal year 1991 dollars).**

**Dr. HECKER. See attached tables.**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FULL-TIME
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and Research
DOE Defense Programs
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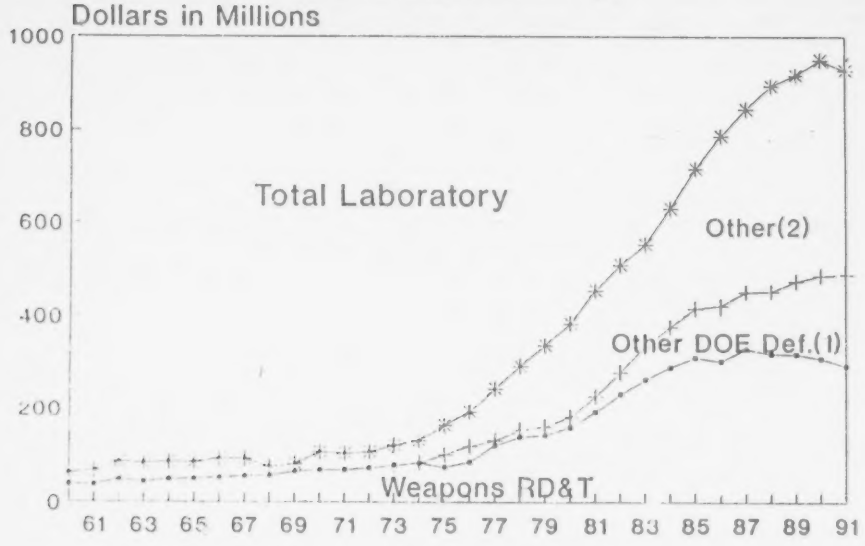
YEAR

# Los Alamos National Laboratory
## Funding History




(1)V&CT, S&S, P&S, NMP, & Def. Waste (2) Non-Def. DOE Programs & all Other

NUCLEAR DIRECTED ENERGY WEAPONS PROGRAM

Senator KENNEDY. Dr. Hecker, I find that the NDEW research program lacks a clear rationale to justify its expense, especially in light of the recent collapse of cold war barriers in Europe and the Soviet Union's worsening technical and economic difficulties. Do you concur with the Department of Energy's continued characterization of the NDEW research and test program as a "threat assessment of what might be accomplished by the Soviet Union in this area, even as the Soviet Union and others have sought, both before the inception of the NDEW program and every year since, to negotiate both a comprehensive test ban and a ban on the testing and deployment of anti-missile and anti-satellite weapons in space?

Dr. HECKER. For the nuclear weapons program and for NDEW, I support the rationale to determine the feasibility and the effectiveness of nuclear systems which an adversary such as the Soviet Union might develop for use against the United States. The research by Los Alamos in the NDEW arena has convinced me that these concepts have real potential and may pose a future threat to the United States deterrent. As you are aware, for fiscal year 1991 the NDEW program has now been rejoined with the core nuclear weapons research program, and these investigations will be carried out at a reduced level as an integral part of the core nuclear weapons program.

Senator KENNEDY. Dr. Hecker, is this "threat assessment" characterization simply an exercise in bad faith, or are you aware of analyses demonstrating that even under the restrictions imposed by these arms control agreements, the U.S.S.R. could develop viable NDEWs through a combination of computer simulation and undetected low yield (< 1kt.) nuclear testing? Please provide to the committee copies of any such analyses performed by Los Alamos.

Dr. HECKER. I believe the best agency to address this issue would be the CIA or the DIA. Los Alamos has participated in some of these studies. Los Alamos has done no independent analysis of Soviet NDEW capabilities at lower thresholds. However, the impacts on our nuclear weapons programs are in the 1988 Senate Armed Services Committee report and will be updated in the report requested by Senator Nunn of the Department of Energy at the TTBT hearings in September 1990.

## QUESTIONS SUBMITTED BY SENATOR STROM THURMOND

### INDEMNIFICATION BY OTHER AGENCIES

Senator THURMOND. Mr. Christesen, environmental problems are present at Federal facilities other than the Department of Energy. Are you aware of any other Federal agencies which are considering rules on indemnification on its management and operations contracts?

Mr. CHRISTESEN. Yes. The Department of Defense is currently reviewing the allowability of certain environmental costs at both its government-owned/contractor-operated facilities as well as its contractor-owned sites. The Department of Defense could give you the exact status of this review.

### IMPACT ON U.S. INDUSTRIAL BASE

Senator THURMOND. Mr. Pitts, what impact will the Department of Energy proposed rule on indemnification have on the United States nuclear industrial base?

Mr. PITTS. This is a difficult question to answer. One of Westinghouse's motivations in seeking award of the M&O contract at certain of the Department of Energy's facilities was specifically to be able to participate in the development of nuclear technology and to maintain the expertise which Westinghouse had in its commercial nuclear operations. This was particularly important in light of the commercial nuclear down-trend. If the new Department of Energy rules ultimately would make it untenable for a corporation such as Westinghouse to continue functioning as an M&O contractor at the locations where the nuclear expertise is key, then it could have an impact on the ability of Westinghouse to maintain a cadre of experts in the nuclear area.

### DEPARTMENT OF DEFENSE

Senator THURMOND. Mr. Gleason, is this issue of third party liability also a problem for the Department of Defense environmental restoration program?

Mr. GLEASON. The issue of third party liability is very definitely a problem for the Department of Defense environmental restoration program. As stated in my written testimony distributed at the May 23, 1900 hearing, there is an absence of widely accepted standards to guide engineers in the investigation of hazardous waste sites, and in the design and implementation of remedies for such sites. This lack of standards is exacerbated by the rise in expensive and unpredictable toxic tort litigation, which is characterized by long latency periods, numerous plaintiffs, and potential huge liabilities.

Federal facility work, including work for the Department of Defense and the Department of Energy, entails additional risk considerations. For example, environmental cleanup firms do not own the Federal facilities where the work will be performed, and are not responsible for the existence of waste at these sites. However, such firms are liable for third party damages caused by cleanup activities at these sites. In addition, the special legal defenses available to the sovereign make contractors a likely target for third party lawsuits.

During the May 23, 1990 hearing, my oral testimony identified the differences that exist among the policies of the individual armed services within the Department of Defense regarding contractor liabilities and indemnification. The Department of Defense is currently studying contractor liabilities and indemnification, and is expected to report to your committee on the results of this study in late March. I would greatly appreciate the opportunity to testify on behalf of HWAC in hearings held by your committee with regard to the Department of Defense's indemnification study.

### EXISTING CONTRACTS

Senator THURMOND. Mr. Christesen, if this indemnification rule is adopted by the Department of Energy as proposed, what impact do you expect on existing contracts?

Mr. CHRISTESEN. It is my opinion that subcontractors such as Ebasco would not accept unilateral contract modifications to existing contracts unless the rule is modified to give subcontractors higher fees and an appropriate liability cap.

ATTRACTING CONTRACTORS

Senator THURMOND. Mr. Pitts, considering the opposition to the proposed rule, how difficult will it be for the Department of Energy to attract competent and qualified contractors for future work?

Mr. PITTS. This is an easier question to answer. If the final rule is implemented in its present proposed form, there would be little incentive for a large corporation to continue in a line of business which is unlikely to generate any profit for the corporation due to the increased financial exposure and unallowable costs which are part of the new rule. There is little doubt that a significant number of competent and qualified contractors would exit the business. We believe it will also be very difficult for the Department to find other competent and qualified replacement contractors.

ADMINISTRATIVE REQUIREMENTS

Senator THURMOND. Mr. Kerr, what are the administrative requirements of the proposed rule on the reimbursement and indemnification and how difficult will they be to enforce?

Mr. KERR. In my view, the administrative burdens placed upon the contractor and the Department of Energy contracting officer by the imposition of the NOPR increase tremendously both in terms of the number of required actions and of the complexities of issues. What previously had been a partnership effort between the contractor and the Government can only become a battle of forms as each side finds it necessary to document in the smallest detail data received from the other, since neither can be assured as to what facts will be important in the disputes that will arise when, sometime in the future, the contracting officer seeks to impose indemnification requirements upon a contractor.

Contracting officers who were previously required to have expertise in the implementation of the government procurement regulations will be required by the new rules to make basic determinations on contractor negligence issues. Administrating law judges on the Board of Contract Appeals who are experts in government contract law and who may have little or no experience in common law tort matters will be required to decide negligence issues arising in a variety of jurisdictions.

Can you imagine the rancorous finger-pointing that will result when contracting officers attempt to impose liability in multi-contractor operations? Arguments about these issues and the allowability of legal costs associated with them will multiply ten-fold. In short, I think the rule will result in an administrative nightmare the extent of which could not have been contemplated by the rule drafters.

[Whereupon, at 12:38 p.m., the hearing was adjourned.]

# DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1991

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TUESDAY, JUNE 12, 1990

U.S. SENATE,
COMMITTEE ON DEFENSE INDUSTRY AND TECHNOLOGY,
COMMITTEE ON ARMED SERVICES,
*Washington, DC.*

## INTERNATIONAL DEFENSE TRADE AND COOPERATION

The subcommittee met, pursuant to notice, at 9:35 a.m., in room SR-232A, Russell Senate Office Building, Senator Jeff Bingaman (chairman of the subcommittee), presiding.

Committee members present: Senators Bingaman and Wallop.

Professional staff members present: Robert G. Bell and Richard D. Finn, Jr.

Minority staff members present: Jonathan L. Etherton, Judith A. Freedman, and Durwood W. Ringo, Jr., professional staff members.

Staff assistants present: Claire M. Kelly and Melissa Ann Ramsey.

Committee members' assistants present: Edward M. McGaffigan, Jr. and John Gerhart, assistants to Senator Bingaman; Jefferson B. Seabright, assistant to Senator Wirth; Melvin G. Dubee, assistant to Senator Byrd; Lee W. Whittaker, assistant to Senator Wallop; and Charles G. Pearcy, assistant to Senator Lott.

### OPENING STATEMENT OF SENATOR JEFF BINGAMAN, CHAIRMAN

Senator BINGAMAN. This subcommittee will come to order.

I understand Senator Wallop is voting and will be here shortly, but we will proceed in his absence.

The Subcommittee on Defense Industry and Technology meets to receive testimony on the subject of international defense trade and cooperation. For many years, this subcommittee has promoted measures to make the U.S. defense industry as competitive and responsive as possible. Without a strong technological and industrial foundation, our Nation's security cannot be sustained. Defense trade and cooperation between the U.S. and its allies has always influenced the health of our defense industry, but they are likely to grow increasingly important in the future.

Several powerful trends will probably stimulate U.S. firms to compete and cooperate overseas more vigorously than they have in the past. The continuing decline in the U.S. defense budget, the excess capacity of our defense industry, the growing integration of civilian and military technology, and the conversions between the

United States and its allies in their technological sophistication especially in dual-use technologies are combining to make international trade and cooperation more significant for U.S. defense firms. Of course, these same trends are encouraging foreign defense companies to accelerate their own overseas marketing efforts.

The U.S. and foreign government policies that seek to regulate this trade and cooperation are the focus of today's hearing. The policies that we hope to cover this morning are numerous and varied. The menu includes armaments cooperation, export controls, defense offsets, the Korean fighter program, reciprocal defense procurement agreements and the European Community's plan for a single integrated market. Admittedly, this menu of policies constitutes an ambitious agenda for a single hearing. Fortunately, the witnesses that we have today are well qualified to address this broad range of issues.

The first panel consists of three senior officials from the Commerce and Defense Departments. I would like to welcome Deputy Secretary of Commerce Tom Murrin, who has been a witness here on several previous occasions. He last testified before the committee in 1989 as the chairman of the Defense Manufacturing Board.

We greatly appreciate his willingness to be here and testify in his current position as Deputy Secretary of Commerce. The fact that Secretary Murrin is testifying at this hearing demonstrates the important role that the Commerce Department has in developing U.S. Government policies on defense trade and cooperation. He is also symbolic of the growing overlap between U.S. military and civilian technologies.

In 1988 we put a provision in the law that requires the Defense Department to solicit and consider the Commerce Department's views and the economic effects of arms cooperation agreements. In addition, of course, the Commerce Department is deeply involved in some of the other policies that I mentioned earlier, export controls, EC 1992 and defense offsets. I believe that the Commerce Department plays a constructive and complementary role in the area of defense trade and cooperation. We are very pleased that Secretary Murrin would join us.

Testifying with Secretary Murrin on the first panel is Mr. Don Yockey, who is the Deputy Under Secretary of Defense for Acquisition, and Mr. Henry Rowen, the Assistant Secretary of Defense for International Security Affairs. Both Secretary Yockey and Secretary Rowen are here to present the Department of Defense views because the issues that we will take up today are handled by two separate chains of command within the Office of the Secretary of Defense, and we welcome both of them.

After the first panel of administration witnesses, we will receive testimony from a second panel of experts. Dr. Davis Bobrow from the University of Pittsburgh will testify in his capacity as Vice Chair of the Defense Science Board Task Force on Defense Industrial Cooperation with Pacific Rim Nations. I was deeply interested in the recommendations that this task force made. Last December when I was in Japan we had the opportunity to be briefed on this important report, and we are pleased that he could be here today to elaborate on that.

Testifying with Dr. Bobrow in the second panel is Dr. William Keller, a project director at the Office of Technology Assessment. Dr. Keller will be presenting the results of the first report of an assessment that Senators Nunn, Warner, Wallop and I requested on international collaboration in defense technology.

The third witness on the panel is Mr. Robert Calaway, who formerly worked on armaments cooperation in the Office of the Secretary of Defense in the U.S. Mission to NATO. We have asked Mr. Calaway to focus his testimony on the development of defense technology in Europe, especially in the context of European efforts to coordinate this work.

Senator Wallop may have a statement to make when he arrives, but we will go right ahead with testimony at this time.

Secretary Murrin, why not start out, and then we will move on to the other panelists.

**STATEMENT OF THOMAS J. MURRIN, DEPUTY SECRETARY OF COMMERCE; ACCOMPANIED BY JOHN A. RICHARDS, DEPUTY ASSISTANT SECRETARY, INDUSTRIAL RESOURCE ADMINISTRATION, U.S. DEPARTMENT OF COMMERCE**

Mr. MURRIN. Thank you very much, Mr. Chairman, and good morning. I am very pleased to be here to discuss the future of international defense trade and cooperation and Department of Commerce policies in this regard. I have a written statement, Mr. Chairman, which I would like to submit for the record.

Senator BINGAMAN. We will include the prepared statements of all the witnesses in the record as if read in full.

Mr. MURRIN. Thank you, sir.

The sweeping changes in Europe and elsewhere will dramatically affect defense issues in the 1990s. The time has come to reassess U.S. Government policies on a number of defense trade, cooperation and industrial base issues. The Departments of Commerce and Defense have developed a solid professional relationship on issues that merge defense and economic security. The result is better coordination within the U.S. Government of both national security and economic policies and priorities.

One example of the benefits of increased cooperation is our role in reviewing defense memoranda of understanding such as our current review of the Korean fighter program. The Commerce team has participated in discussions and negotiations on the Memorandum of Understanding (MOU), and we will be taking part in the final negotiating session as well.

Offset requirements arose as a major issue in connection with the Korean fighter program. As you may recall, Secretaries Mosbacher and Cheney were instrumental in limiting industrial offsets for this program to a maximum of 30 percent of the contract value. The Commerce Department will be working closely with the Defense Department and other interested agencies to implement the President's recently announced policy of offsets in regard to military exports. We will be on the interagency team that will begin discussions with foreign governments with the goal of limiting the adverse effects of offsets.

In your letter of invitation, you asked me to address the Nunn-Warner amendment on cooperative research and development. Commerce strongly supports the initiative of this amendment in promoting cooperative research and development ventures with our allies. The high cost and complexity of developing new weapons systems will increasingly dictate the use of such a cooperative approach, especially in times of declining defense budgets. It is important, however, that the commercial and industrial impacts of proposed Nunn-Warner amendment projects receive due consideration.

I would like to turn now to another major issue in international defense procurement, reciprocal procurement memoranda of understanding. The Department of Commerce is certainly in favor of the overall goal of reciprocal procurement MOUs in order to provide access for U.S. firms to compete for foreign defense contracts on an equal basis with their foreign competitors, just as foreign firms can compete for U.S. defense contracts.

Some of our industry advisers tell us, however, that while the reciprocal procurement MOUs are an excellent idea in theory, the actual benefits for U.S. firms have been limited. So the Department of Commerce is working closely with the Department of Defense and the Office of the U.S. Trade Representative to establish procedural requirements in the MOUs that guarantee equal treatment for all potential suppliers.

In addition to working to improve the effectiveness of reciprocal procurement MOUs, Commerce is exploring ways to better assist U.S. industry in identifying and gaining overseas defense contracts. The ability of the U.S. defense industry to participate in European markets is particularly important, since Europe is both our largest export market for U.S. defense products as well as our biggest competitor. Thus, the unification of European markets by 1992 is of particular significance for the U.S. defense industry.

While EC directives do not relate specifically to defense issues, they do affect the political and economic operating environment for all European industry. They also set the tone for U.S. contractors doing business in the European market. EC 1992, however, poses both benefits and challenges to the U.S. defense industry. The Department of Commerce continues to evaluate EC directives as they are issued to determine the implications for U.S. industry and to react accordingly. We also have established extensive programs to provide U.S. industry with information on the opportunities and the challenges raised by EC 1992.

Another area relevant to the defense industrial base within the Department of Commerce's scope of review is the control of exports. The U.S. defense industry invariably cites controls as a major bottleneck to exports. The administration has been evaluating and restructuring the U.S. and multilateral export control system in response to the dramatic events in Eastern Europe and the Soviet Union.

On May 2, the President announced the comprehensive U.S. proposal to COCOM that would immediately eliminate the need for about one-half of all export licenses while enhancing U.S. national security and economic interests. Three priority sectors, computers, machine tools and telecommunications equipment were emphasized for decontrol.

That proposal was the basis of discussions last week at a high level meeting of the members of COCOM. We are very pleased with the results of the COCOM high level meeting. Agreement was reached on a comprehensive proposal to streamline the current control list and to commit to a complete restructuring of our export control system by the year's end. The immediate relaxation and longer term restructuring of the export control system will have a significant impact on U.S. exporters' ability to effectively compete in the international marketplace, including the defense market.

I want to note that my written statement provides detailed information about Commerce Department programs to assess the competitiveness and capabilities of critical defense sectors. We are currently studying the semiconductor manufacturing equipment industry and the robotics industry, among others.

My statement also provides details on a joint Government/industry program managed by Commerce to improve the quality of American goods and services and the strength of our industrial base. We have a wonderful new incentive for total quality management, the Malcolm Baldrige National Quality Award. This award and the related education program offers a process of self-examination for TQM. The program is helping countless companies and other organizations to achieve real quality improvement results.

In conclusion, I want to assure you that the Department of Commerce is actively addressing defense base and trade issues in a variety of ways. We are continually assessing the capabilities of industry and providing recommendations for resolving problems. We are restructuring our programs to assist defense and high-tech exporters by loosening export restrictions, by better promoting U.S. defense products abroad, and by assisting U.S. industry in its efforts to improve quality and competitiveness.

We are joining with our allies and friends to improve the defense trade and procurement environment. We are also working much more closely with our colleagues at the Defense Department to ensure that in each and every instance all aspects of international defense cooperation are considered: military, economic, industrial and technological.

I thank you for this opportunity, and I would be pleased now or later to try to answer any questions you may have.

[The prepared statement of Mr. Murrin follows:]

TESTIMONY OF
THE HONORABLE THOMAS J. MURRIN
DEPUTY SECRETARY OF COMMERCE

GOOD MORNING, MR. CHAIRMAN AND MEMBERS OF THE COMMITTEE. I'M PLEASED TO BE HERE TO DISCUSS THE FUTURE OF INTERNATIONAL DEFENSE TRADE AND COOPERATION, AND DEPARTMENT OF COMMERCE POLICIES IN THIS REGARD.

OBVIOUSLY, THE SWEEPING CHANGES IN EUROPE AND ELSEWHERE WILL DRAMATICALLY AFFECT THE WAY THAT WE ADDRESS DEFENSE ISSUES IN THE 1990'S. THE TIME HAS COME TO REASSESS U.S. GOVERNMENT POLICIES ON A NUMBER OF DEFENSE TRADE, COOPERATION AND INDUSTRIAL BASE ISSUES.

IN RECENT YEARS, THE DEPARTMENT OF COMMERCE HAS BEEN GIVEN INCREASED RESPONSIBILITIES IN THESE AREAS. OUR EXPANDED ROLE IS BASED ON AN INCREASED UNDERSTANDING OF THE CLOSE RELATIONSHIP BETWEEN OUR ECONOMIC, INDUSTRIAL AND TECHNOLOGICAL STRENGTH AND OUR NATIONAL SECURITY.

THE DEPARTMENTS OF COMMERCE AND DEFENSE HAVE DEVELOPED A SOLID, PROFESSIONAL RELATIONSHIP ON ISSUES THAT MERGE DEFENSE AND ECONOMIC SECURITY. THIS IMPROVED RELATIONSHIP EXTENDS FROM THE HIGHEST LEVELS OF MANAGEMENT, DOWN TO THE WORKING LEVEL. THE RESULT IS BETTER COORDINATION WITHIN THE U.S. GOVERNMENT OF BOTH NATIONAL SECURITY AND ECONOMIC POLICIES AND PRIORITIES.

MOU REVIEW AND KFP

ONE EXCELLENT EXAMPLE OF THE BENEFITS OF INCREASED COOPERATION BETWEEN OUR TWO DEPARTMENTS IS OUR ROLE IN REVIEWING DEFENSE MEMORANDA OF UNDERSTANDING.

COMMERCE BECAME INVOLVED IN THE REVIEW OF DEFENSE MOUs AS A RESULT OF THE DEFENSE AUTHORIZATION ACT OF 1989. WE ARE SPECIFICALLY TASKED TO PROVIDE INFORMATION AND RECOMMENDATIONS TO THE DEPARTMENT OF DEFENSE WITH RESPECT TO THE EFFECT OF MOUs ON THE U.S. INDUSTRIAL BASE.

THE AUTHORIZATION ACT OF 1990 FURTHER EXPANDED AND DEFINED OUR ROLE. UNDER THE NEW LAW, COMMERCE ALSO IS ASKED TO PROVIDE INFORMATION AND RECOMMENDATIONS ON THE COMMERCIAL IMPLICATIONS OF MOUs, AND THEIR POTENTIAL EFFECT ON THE INTERNATIONAL COMPETITIVE POSITION OF U.S. INDUSTRY. I AM PLEASED THAT WE ARE ABOUT TO FINALIZE A JOINT AGREEMENT WITH THE DEPARTMENT OF DEFENSE ON PROCEDURES FOR MOU REVIEW. THIS WILL ENHANCE OUR WORKING COOPERATION.

THERE ARE SEVERAL IMPORTANT AREAS OF PROPOSED MOUs WHICH COMMERCE CONSIDERS IN ITS REVIEW PROCESS. FOR EXAMPLE, WE STUDY THE DEGREE AND LEVEL OF U.S. INDUSTRIAL PARTICIPATION, THE FINANCIAL BENEFITS, TECHNOLOGY TRANSFER AND FLOWBACK, AND OVERALL TRADE IMPACTS.

ONE OF SEVERAL MOUs WE ARE CURRENTLY REVIEWING COVERS THE KOREAN FIGHTER PROGRAM. OUR REVIEW HAS BEEN DIRECTED AT ASSESSING THE POTENTIAL ADVERSE IMPACTS TO U.S. INDUSTRY WHICH COULD RESULT FROM CO-PRODUCTION OF THE F/A-18 AIRCRAFT IN KOREA. THIS PAST JANUARY, OUR DEPARTMENT ORGANIZED A GROUP COMPOSED OF REPRESENTATIVES OF THE ECONOMIC AGENCIES TO CONDUCT A REVIEW OF THE MOU DOCUMENT. THIS INTERAGENCY REVIEW, ALONG WITH AN INDEPENDENT COMMERCE REVIEW, ANALYZED THE INDUSTRIAL COMPETITIVENESS AND TECHNOLOGY TRANSFER ASPECTS OF THE MOU TEXT. THE LONG-TERM INDUSTRIAL IMPACT OF KOREAN CO-PRODUCTION OF A NUMBER OF ITEMS CONTAINED IN A SIDE ANNEX TO THE MOU ALSO WERE EVALUATED.

AS A RESULT, SEVERAL CLARIFICATIONS AND MODIFICATIONS TO THE ORIGINAL MOU WERE MADE WHICH TIGHTENED LANGUAGE IN AREAS AFFECTING INTELLECTUAL PROPERTY RIGHTS OF DATA, KOREAN ACCESS TO U.S. TECHNICAL DATA, TECHNOLOGY FLOWBACK PROVISIONS, AND DISPUTE RESOLUTION.

OFFSET REQUIREMENTS ALSO AROSE AS ANOTHER MAJOR ISSUE IN CONNECTION WITH THE KOREAN FIGHTER PROGRAM. AS YOU MAY RECALL, SECRETARIES MOSBACHER AND CHENEY WERE INSTRUMENTAL IN LIMITING INDUSTRIAL OFFSETS FOR THIS PROGRAM TO A MAXIMUM OF 30 PERCENT OF THE CONTRACT VALUE. PRIOR TO THEIR INTERCESSION, THE INTENSE COMPETITION BETWEEN THE TWO U.S. BIDDERS HAD REPORTEDLY DRIVEN KOREAN DEMANDS FOR OFFSETS TO MORE THAN 100 PERCENT.

THE KOREAN FIGHTER PROGRAM HAS MARKED THE FIRST TIME COMMERCE HAS BEEN DIRECTLY INVOLVED IN THE NEGOTIATION OF AN MOU. A COMMERCE TEAM HAS PARTICIPATED IN THE WORKING LEVEL DISCUSSIONS ON THE MOU DOCUMENT AND THE DISCUSSIONS HELD ON THE INDUSTRY-TO-INDUSTRY COMPONENT OF THE PROGRAM. WE ALSO WILL BE PARTICIPATING IN THE FINAL NEGOTIATING SESSION TO BE HELD IN THE NEAR FUTURE.

IN SUM, WE BELIEVE THAT OUR RECOMMENDATIONS AND CONTRIBUTIONS TO THE MOU REVIEW PROCESS IN GENERAL -- AND THE KOREAN FIGHTER PROGRAM IN PARTICULAR -- ARE MAKING A DIFFERENCE.

OUR DEPARTMENT HAS RECENTLY DEDICATED ADDITIONAL RESOURCES TO THE EXAMINATION OF THESE AGREEMENTS, ALLOWING EVEN CLOSER SCRUTINY AND THE DEVELOPMENT OF SOME NEW ANALYTICAL APPROACHES. WE ARE LOOKING FORWARD TO A PERIOD OF GROWTH IN OUR CAPABILITIES IN THIS AREA.

ANOTHER AREA IN WHICH THE DEPARTMENTS OF COMMERCE AND DEFENSE ARE WORKING TOGETHER EFFECTIVELY TO SUPPORT OUR INDUSTRIAL BASE IS JOINT RESEARCH AND DEVELOPMENT. FOR EXAMPLE, RESEARCH BEING CARRIED OUT AT COMMERCE'S NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST) ON AUTOMATED MANUFACTURING SYSTEMS AND STANDARDS IS SPONSORED BY THE DEPARTMENT OF DEFENSE AND COMPLEMENTS WORK BEING DONE IN THIS AREA IN UNIVERSITIES AND PRIVATE FIRMS. COOPERATIVE RESEARCH LIKE THIS CAN IMPROVE OUR DEFENSE CAPABILITIES BY SPEEDING THE APPLICATION OF ADVANCED TECHNOLOGIES AND REDUCING PROCUREMENT COSTS.

ALSO WORTH MENTIONING IS A SMALL, BUT EFFECTIVE INTERAGENCY GROUP ON ADVANCED MANUFACTURING THAT INVOLVES DOD, COMMERCE, NASA, THE U.S. TRADE REPRESENTATIVE'S OFFICE, AND SEVERAL OTHER AGENCIES. THIS COMMITTEE, WHICH I CHAIR, PROVIDES FEDERAL AGENCIES WHICH HAVE A PARTICULAR INTEREST IN THE INDUSTRIAL BASE A FORUM TO COOPERATIVELY FIND WAYS TO ENCOURAGE INDUSTRY TO ADOPT ADVANCED MANUFACTURING TECHNOLOGIES.

INTERNATIONAL COOPERATIVE R&D

IN YOUR LETTER OF INVITATION, YOU ALSO ASKED ME TO ADDRESS THE NUNN-WARNER AMENDMENT ON COOPERATIVE RESEARCH AND DEVELOPMENT. A NUMBER OF THE MOUs SENT TO THE DEPARTMENT FOR REVIEW HAVE BEEN PART OF THIS PROGRAM.

COMMERCE STRONGLY SUPPORTS THE INITIATIVE OF THE NUNN-WARNER AMENDMENT IN PROMOTING COOPERATIVE RESEARCH AND DEVELOPMENT VENTURES WITH OUR ALLIES. THE HIGH COST AND COMPLEXITY OF DEVELOPING NEW WEAPONS SYSTEMS WILL INCREASINGLY DICTATE THE USE OF SUCH A COOPERATIVE APPROACH, ESPECIALLY IN TIMES OF DECLINING DEFENSE BUDGETS.

NUNN-WARNER AMENDMENT FUNDING FOR R&D PROJECTS HAS BEEN ESSENTIAL TO THE INVESTIGATION OF FUTURE TECHNOLOGIES AND THEIR APPLICATIONS. THE WORK PERFORMED ON THESE PROGRAMS IN 1990 MAY NOT APPEAR IN DEPLOYED SYSTEMS UNTIL THE 21ST CENTURY. THE MAJORITY OF NUNN-WARNER MOUs REVIEWED BY COMMERCE HAVE INVOLVED VERY ADVANCED TECHNOLOGIES DESIGNED FOR A SPECIFIC MILITARY APPLICATION.

AS THE EUROPEAN NATIONS STRIVE TO COLLECTIVELY IMPROVE THEIR TECHNOLOGIES, HOWEVER, THE U.S. MUST NOT IGNORE THE COMMERCIAL POTENTIAL OF SOME OF THE TECHNOLOGICAL PROJECTS BEING FUNDED UNDER THE NUNN-WARNER AMENDMENT. IN SHORT, WE BELIEVE THE COMMERCIAL AND INDUSTRIAL IMPACTS OF PROPOSED NUNN-WARNER AMENDMENT PROJECTS SHOULD RECEIVE DUE CONSIDERATION.

OFFSETS IN DEFENSE TRADE

AN ISSUE CLOSELY RELATED TO DEFENSE COOPERATION INVOLVES OFFSETS

IN DEFENSE TRADE. AS YOU KNOW, THE PRESIDENT ANNOUNCED HIS POLICY ON OFFSETS IN MILITARY EXPORTS ON APRIL 16TH. THIS POLICY WAS DEVELOPED IN RESPONSE TO A REQUIREMENT OF THE 1989 DEFENSE AUTHORIZATION ACT.

THE DEPARTMENT OF COMMERCE WAS AN ACTIVE PARTICIPANT IN INTERAGENCY EFFORTS TO DEVELOP AN OFFSET POLICY. BACK IN JANUARY, WE COORDINATED AN EFFORT TO SEEK PRIVATE SECTOR INPUT INTO THE POLICY THROUGH A REQUEST FOR COMMENTS PUBLISHED IN THE FEDERAL REGISTER.

THE POLICY ANNOUNCED BY THE PRESIDENT DOES NOT HINDER OUR DEFENSE FIRMS' ABILITY TO COMPETE IN INTERNATIONAL MARKETS, WHERE OFFSET REQUIREMENTS ARE A SIGNIFICANT FACTOR IN THE COMPETITION. THIS IS IMPORTANT, BECAUSE AS DOMESTIC DEFENSE BUDGETS DECLINE, THE ABILITY OF THE UNITED STATES TO PARTICIPATE IN DEFENSE MARKETS OVERSEAS BECOMES EVEN MORE CRITICAL.

AT THE SAME TIME, THE PRESIDENT HAS STATED THROUGH THE POLICY THAT CERTAIN OFFSETS ARE ECONOMICALLY INEFFICIENT AND MARKET DISTORTING, AND CAN HAVE ADVERSE EFFECTS. THE PRESIDENT ALSO NOTED THAT THE TIME HAS COME TO CONSULT WITH FOREIGN NATIONS WITH A VIEW TO LIMITING THE ADVERSE EFFECTS OF OFFSETS.

THE DEPARTMENT OF COMMERCE WILL CONTINUE TO WORK CLOSELY WITH THE DEPARTMENT OF DEFENSE AND OTHER INTERESTED AGENCIES TO IMPLEMENT THE PRESIDENT'S DIRECTIVE.

THE TIMING IS RIGHT TO BEGIN TO DISCUSS THE OFFSET ISSUE WITH OTHER GOVERNMENTS. IN TIMES OF DECLINING DEFENSE BUDGETS, THIS SHOULD BE DISCUSSED.

MOREOVER, IN THEIR EFFORTS TO UNIFY AND CONSOLIDATE, SOME EUROPEAN GOVERNMENTS HAVE PROPOSED ELIMINATION OFFSETS WITHIN EUROPEAN DEFENSE TRANSACTIONS. CONSEQUENTLY, U.S. FIRMS MAY BE AT A DISADVANTAGE VIS-A-VIS THEIR EUROPEAN COMPETITORS.

FINALLY, IT SHOULD BE ACKNOWLEDGED THAT SOME OFFSETS ARE INEFFICIENT AND THEY CAN RAISE THE COST OF WEAPONS SYSTEMS TO THE BUYER. AS DEFENSE BUDGETS TIGHTEN, WE MUST ADOPT POLICIES WHICH REAP MAXIMUM BENEFIT FROM EACH ALLIANCE DOLLAR.

THUS, AS PART OF THE INTERAGENCY TEAM, THE DEPARTMENT OF COMMERCE WILL TRY TO ACHIEVE UNDERSTANDINGS WITH OUR ALLIES ON USE OF OFFSETS TO LIMIT THEIR ADVERSE IMPACTS ON U.S. AND FOREIGN INDUSTRY, AS CALLED FOR BY THE PRESIDENT'S POLICY.

RECIPROCAL PROCUREMENT MOUs

I'D LIKE TO TURN NOW TO ANOTHER MAJOR ISSUE IN INTERNATIONAL

DEFENSE PROCUREMENT: RECIPROCAL PROCUREMENT MEMORANDA OF UNDERSTANDING.

THE DEPARTMENT OF COMMERCE IS CERTAINLY IN FAVOR OF THE OVERALL GOAL OF RECIPROCAL PROCUREMENT MOUs -- TO PROVIDE ACCESS FOR U.S. FIRMS TO COMPETE FOR FOREIGN DEFENSE CONTRACTS ON AN EQUAL BASIS WITH THEIR FOREIGN COMPETITORS, JUST AS FOREIGN FIRMS CAN COMPETE FOR U.S. DEFENSE CONTRACTS. THE REMOVAL OF BARRIERS TO DEFENSE TRADE IS A POSITIVE STEP, JUST AS IN THE COMMERCIAL ARENA.

HOWEVER, SOME OF OUR INDUSTRY ADVISORS TELL US THAT WHILE THE RECIPROCAL PROCUREMENT MOUs ARE AN EXCELLENT IDEA IN THEORY, THE ACTUAL BENEFITS FOR THEIR FIRMS HAVE BEEN LIMITED. ACCORDING TO THEM, IN EXCHANGE FOR ACCESS TO THE VAST MAJORITY OF U.S. DEFENSE PROCUREMENT, THEY ARE RECEIVING ONLY A PLEDGE BY OUR ALLIES OF RECIPROCAL ACCESS TO THEIR DEFENSE MARKETS.

THE WORLD AS A WHOLE HAS CHANGED DRAMATICALLY SINCE THE FIRST RECIPROCAL MOUs WERE SIGNED IN THE EARLY 1970'S. FOR EXAMPLE, THE HISTORICAL TRADE SURPLUS OF THE UNITED STATES WITH MOU COUNTRIES HAS NARROWED FROM A 4:1 ADVANTAGE IN 1983 TO LESS THAN 3:1 TODAY. THIS MUST BE TAKEN INTO CONSIDERATION WHEN THE U.S. LOOKS AT DEFENSE TRADE AND DEFENSE INDUSTRIAL BASE ISSUES.

THE DEPARTMENTS OF COMMERCE AND DEFENSE AND THE OFFICE OF THE U.S. TRADE REPRESENTATIVE ARE EXPLORING IDEAS TO STRENGTHEN THE MOUs. IN PARTICULAR, CERTAIN STANDARD PROVISIONS ARE NEEDED IN ALL RECIPROCAL MOUs THAT LAY OUT SPECIFIC PROCEDURES GUARANTEEING EQUAL TREATMENT FOR SUPPLIERS AND TRANSPARENCY IN BIDDING, NOTIFICATION, AND DISPUTE RESOLUTION.

IN ADDITION TO WORKING TO IMPROVE THE EFFECTIVENESS OF RECIPROCAL PROCUREMENT MOUs, COMMERCE IS EXPLORING WAYS TO BETTER ASSIST U.S. INDUSTRY IN IDENTIFYING AND CAPTURING OVERSEAS DEFENSE CONTRACTS.

IN THE PAST, FOREIGN POLICY AND NATIONAL SECURITY CONCERNS HAVE LIMITED U.S. GOVERNMENT EFFORTS TO PROMOTE DEFENSE EXPORTS. OUR COMPETITORS, HISTORICALLY MORE RELIANT ON EXPORTS, HAD FEWER SUCH CONCERNS AND THEIR GOVERNMENTS HAVE ACTIVELY ENCOURAGED AND FOSTERED DEFENSE EXPORT SALES. ALTHOUGH STILL IN THE PRELIMINARY STAGES, WE ARE WORKING JOINTLY WITH DEFENSE TO IDENTIFY DEFENSE EXPORT OPPORTUNITIES THROUGH ENHANCED COOPERATION BETWEEN OUR TWO AGENCIES' WORLDWIDE NETWORKS OF DEFENSE AND COMMERCIAL EXPERTS.

EC 1992 AND THE DEFENSE INDUSTRY

EUROPE IS THE LARGEST EXPORT MARKET FOR U.S. DEFENSE PRODUCTS. IN FACT, IN THE 1980'S EUROPE ACCOUNTED FOR NEARLY ONE THIRD OF OUR TOTAL DEFENSE EXPORTS. EUROPEAN FIRMS AND CONSORTIA ARE ALSO

OUR BIGGEST COMPETITORS IN THE DEFENSE ARENA, BOTH IN EUROPE AND IN THIRD COUNTRY MARKETS.

THUS, THE UNIFICATION OF EUROPEAN MARKETS BY 1992 IS OF PARTICULAR SIGNIFICANCE FOR THE U.S. DEFENSE INDUSTRY. WHILE E.C. DIRECTIVES DO NOT SPECIFICALLY RELATE TO DEFENSE ISSUES, THEY DO AFFECT THE POLITICAL AND ECONOMIC OPERATING ENVIRONMENT FOR ALL EUROPEAN INDUSTRY. THEY ALSO SET THE TONE FOR U.S. CONTRACTORS DOING BUSINESS IN THE EUROPEAN MARKET.

MOREOVER, THE INDEPENDENT EUROPEAN PROGRAMME GROUP (IEPG), FORMED IN 1976 TO ADDRESS EUROPEAN DEFENSE PROCUREMENT, HAS OUTLINED AN ACTION PLAN TO PROMOTE MORE OPEN COMPETITION IN EUROPEAN DEFENSE PROCUREMENT.

EC 1992 POSES BOTH BENEFITS AND CHALLENGES TO THE U.S. DEFENSE INDUSTRY. A CONSOLIDATED EUROPEAN MARKET WILL BE EASIER FOR U.S. FIRMS TO DO BUSINESS WITH -- IT WILL BE A SINGLE LARGE MARKET, WITH ONE SET OF RULES, HARMONIZED STANDARDS, AND LOWER DISTRIBUTION COSTS. EUROPE 1992 IS MOVING CLOSER TOWARD THE OBJECTIVES WE HAVE BEEN PURSUING THROUGH THE GATT -- FREER AND FAIRER TRADE.

ON THE OTHER HAND, A UNITED EUROPE ALSO WILL LEAD TO MORE FORMIDABLE COMPETITORS IN BOTH DEFENSE AND COMMERCIAL SECTORS. THE 1992 PROGRAM IS DESIGNED TO FACILITATE COOPERATION AMONG EUROPEAN COUNTRIES TO PRODUCE LARGER, MORE EFFICIENT COMPETITORS.

WE ALREADY HAVE SEEN EVIDENCE OF THIS CONSOLIDATION. THE ACQUISITION BY THOMSON OF FRANCE OF THE DUTCH PHILIPS DEFENSE ELECTRONICS DIVISION IS AN EXAMPLE. GERMANY'S DAIMLER BENZ' TAKEOVER OF ITS COMPETITOR, MBB, IS ANOTHER EXAMPLE. THE RESULTING DEUTSCHE AEROSPACE IS ONE OF THE TOP AEROSPACE COMPANIES IN THE WORLD.

THE DEPARTMENT OF COMMERCE CONTINUES TO EVALUATE EC DIRECTIVES AS THEY ARE ISSUED TO DETERMINE THE IMPLICATIONS FOR U.S. INDUSTRY, AND REACT ACCORDINGLY. WE ARE PARTICULARLY CONCERNED WITH SOME OF THE DIRECTIVES RELATING TO STANDARDS AND RULES OF ORIGIN.

WE ALSO HAVE ESTABLISHED EXTENSIVE PROGRAMS TO PROVIDE U.S. INDUSTRY WITH INFORMATION ON THE OPPORTUNITIES AND CHALLENGES RAISED BY EC 1992.

<u>EXPORT CONTROLS & COCOM</u>

ANOTHER AREA RELEVANT TO THE DEFENSE INDUSTRIAL BASE WITHIN THE DEPARTMENT OF COMMERCE'S SCOPE OF REVIEW IS THE CONTROL OF EXPORTS. THE U.S. DEFENSE INDUSTRY INVARIABLY CITES CONTROLS AS A MAJOR BOTTLENECK TO EXPORTS.

THE ADMINISTRATION HAS BEEN STRIVING FOR SEVERAL MONTHS TO EVALUATE AND RESTRUCTURE THE U.S. AND MULTILATERAL EXPORT CONTROL SYSTEM IN RESPONSE TO THE DRAMATIC EVENTS IN EASTERN EUROPE AND THE SOVIET UNION.

ON MAY 2nd, THE PRESIDENT ANNOUNCED A COMPREHENSIVE U.S. PROPOSAL TO COCOM THAT WILL IMMEDIATELY ELIMINATE THE NEED FOR ABOUT HALF OF ALL COMMERCE-ISSUED EXPORT LICENSES WITHOUT COMPROMISING NATIONAL SECURITY. THE PROPOSAL ALSO WILL ENSURE THE CONTINUED EFFECTIVENESS OF COCOM IN PROTECTING U.S. NATIONAL SECURITY INTERESTS WHILE ENHANCING U.S. STRATEGIC TECHNOLOGY COMPETITIVENESS. THAT PROPOSAL WAS THE SUBJECT OF MUCH DISCUSSION LAST WEEK AT A HIGH-LEVEL MEETING OF THE MEMBERS OF COCOM. I AM VERY PLEASED WITH THE RESULTS OF THE MEETING. AGREEMENT WAS REACHED ON A COMPREHENSIVE PROPOSAL TO STREAMLINE THE CURRENT CONTROL LIST AND COMMIT TO A COMPLETE RESTRUCTURE OF CUR EXPORT CONTROL SYSTEM BY YEAR END 1990.

THE IMMEDIATE RELAXATION OF SOME OF THE EXISTING COCOM EXPORT CONTROLS AND THE LONGER TERM RESTRUCTURING OF THE EXPORT CONTROL SYSTEM WILL HAVE A MAJOR IMPACT ON U.S. EXPORTERS' ABILITY TO COMPETE EFFECTIVELY IN THE INTERNATIONAL MARKETPLACE. IN ADDITION, THIS NEW PROPOSAL IS OF GREAT CONSEQUENCE TO THE NEWLY DEMOCRATIZING COUNTRIES OF EASTERN EUROPE THAT ADOPT SAFEGUARD REGIMES. THEY MAY GAIN ACCESS TO EVEN MORE SOPHISTICATED EQUIPMENT AND TECHNOLOGIES TO UPGRADE THEIR INDUSTRIAL INFRASTRUCTURES. THE ECONOMIC SUCCESS OF THESE EMERGING EAST EUROPEAN DEMOCRACIES IS IN OUR LONG-TERM NATIONAL INTEREST.

INDUSTRIAL CAPABILITIES

IN ADDITION TO OUR EXPORT CONTROL AND PROMOTION FUNCTIONS, THE DEPARTMENT OF COMMERCE ADMINISTERS PROGRAMS DESIGNED TO ASSESS THE COMPETITIVENESS AND CAPABILITIES OF CRITICAL DEFENSE SECTORS.

WE ARE WORKING JOINTLY WITH THE NAVY TO ASSESS THE FOREIGN DEPENDENCIES AND SOURCING IN THREE CRITICAL NAVY SYSTEMS -- RIGHT DOWN TO THE RAW MATERIAL LEVEL.

WE ALSO ARE UNDERTAKING TWO SECTORAL NATIONAL SECURITY INDUSTRIAL ASSESSMENTS OF THE SEMICONDUCTOR MANUFACTURING EQUIPMENT INDUSTRY AND THE ROBOTICS INDUSTRY. THESE TWO SECTORS ARE CLOSELY RELATED TO DOD'S 1990 LIST OF 20 CRITICAL TECHNOLOGIES.

OUR PRELIMINARY ANALYSIS IS QUITE DISTURBING. IN THE SEMICONDUCTOR MANUFACTURING EQUIPMENT INDUSTRY, THE U.S. SHARE OF THE WORLD MARKET HAS DECLINED 35% SINCE 1982, WHILE JAPAN'S SHARE HAS INCREASED BY 52%. THE TOP THREE COMPANIES IN THE WORLD IN TERMS OF SALES ARE FOREIGN; IN EARLIER YEARS, THEY WERE ALL U.S. FIRMS. U.S. FIRMS HAVE BEEN THE TARGET OF FOREIGN TAKEOVERS, FURTHER COMPLICATING THE SITUATION.

IN THE CRITICAL ROBOTICS INDUSTRY, JAPAN CONTROLS OVER 50 PERCENT OF THE WORLD MARKET, DESPITE THE FACT THAT THE U.S. INVENTED THE ROBOT IN THE 1950'S. IN THE U.S., MANY FIRMS ARE EITHER FOREIGN OWNED, OR ARE MERELY ASSEMBLY OPERATIONS FOR FOREIGN COMPONENTS.

AS OUR STUDIES PROGRESS, WE HOPE TO MAKE RECOMMENDATIONS TO ENSURE THAT THE UNITED STATES MAINTAINS THE ABILITY TO DESIGN AND MANUFACTURE SUPERIOR PRODUCTS TO SUPPORT NATIONAL SECURITY REQUIREMENTS.

CONCLUSION

BEFORE I CLOSE, I WANT TO SAY A FEW WORDS ABOUT A SUBJECT THAT APPLIES TO BOTH THE PRIVATE SECTOR AND THE GOVERNMENT, AND THAT IS VITAL TO THE FUTURE OF OUR INDUSTRIAL BASE -- TOTAL QUALITY MANAGEMENT (TQM).

I COMMEND THE DEFENSE DEPARTMENT FOR ITS NEW EMPHASIS ON TOTAL QUALITY MANAGEMENT AND ITS COMMITMENT TO ACTIONS THAT WILL ENSURE THAT TQM POLICIES AND PROCEDURES ARE PUT IN PLACE. THE COMMERCE DEPARTMENT IS SIMILARLY INSTITUTING TQM. SECRETARY MOSBACHER AND I HAVE MADE IMPROVING QUALITY OF AMERICAN GOODS AND SERVICES ONE OF OUR DEPARTMENT'S KEY GOALS.

WE HAVE A WONDERFUL NEW INCENTIVE FOR TQM -- THE MALCOLM BALDRIGE NATIONAL QUALITY AWARD. MANAGED BY THE COMMERCE DEPARTMENT IN CLOSE COOPERATION WITH THE PRIVATE SECTOR, THIS AWARD AND THE RELATED EDUCATION PROGRAM OFFERS A PROCESS OF SELF-EXAMINATION FOR TQM. NOW IN ITS THIRD YEAR, THE PROGRAM IS HELPING COMPANIES AND OTHER ORGANIZATIONS TO ACHIEVE REAL QUALITY IMPROVEMENT RESULTS. MORE THAN 100,000 COPIES OF THE AWARD APPLICATIONS -- WHICH DOUBLE AS PRACTICAL GUIDES TO IMPROVING QUALITY -- HAVE BEEN DISTRIBUTED SO FAR THIS YEAR. THAT'S A HUGH INCREASE OVER THE PREVIOUS TWO YEARS, AND THOUSANDS OF ORGANIZATIONS ARE BENEFITTING BY BUILDING QUALITY INTO THEIR ORGANIZATIONS' STRATEGIC PLANS. THE INSTITUTION OF TQM PRINCIPLES WILL CONTRIBUTE SIGNIFICANTLY TO THE STRENGTH OF OUR INDUSTRIAL BASE.

IN CONCLUSION, THE DEPARTMENT OF COMMERCE IS ACTIVELY ADDRESSING DEFENSE BASE AND TRADE ISSUES IN A VARIETY OF WAYS. WE ARE CONTINUALLY ASSESSING THE CAPABILITIES OF INDUSTRY AND PROVIDING RECOMMENDATIONS FOR RESOLVING PROBLEMS. WE ARE RESTRUCTURING OUR PROGRAMS TO ASSIST DEFENSE AND HIGH-TECH EXPORTERS BY LOOSENING EXPORT RESTRICTIONS, AND TO BETTER PROMOTE U.S. DEFENSE PRODUCTS ABROAD.

WE ARE SEEKING TO WORK WITH OUR ALLIES AND FRIENDS TO IMPROVE THE DEFENSE TRADE AND PROCUREMENT ENVIRONMENT. WE ALSO ARE WORKING MUCH MORE CLOSELY WITH OUR COLLEAGUES AT THE DEFENSE DEPARTMENT

TO ENSURE THAT IN EACH AND EVERY INSTANCE, ALL ASPECTS OF INTERNATIONAL DEFENSE COOPERATION ARE CONSIDERED -- MILITARY, ECONOMIC, INDUSTRIAL, AND TECHNOLOGICAL.

THANK YOU. I WOULD BE PLEASED TO ANSWER ANY QUESTIONS THE COMMITTEE MAY HAVE.

Senator BINGAMAN. Thank you very much.

Before we do any questions, let me turn to Secretary Yockey. Let me see, Senator Wallop, did you wish to make a statement before Secretary Yockey testified?

Senator WALLOP. Mr. Chairman, I have a statement, but in the interest of time, I will submit the statement for the record.

Senator BINGAMAN. It will be included in the record.

[The prepared statement of Senator Wallop follows:]

PREPARED STATEMENT OF SENATOR MALCOLM WALLOP

Mr. Chairman:

I join you in welcoming this distinguished panel of witnesses from the Defense and Commerce Departments. I look forward to hearing their testimony--and that of our second panel of outside experts—on the wide-ranging issues that we are exploring in this hearing.

In particular, I am interested in pursuing two issues in depth—the proposed changes in COCOM regulations and the upcoming agreement on the Korean Fighter Program (KFP).

I am deeply concerned about the relaxation in COCOM restrictions which has been proposed by the administration. I fear that commercial interests were given priority over national security concerns during the administration's review of the export control regime. While I am pleased and encouraged by the events of the past 6 months in Eastern Europe, I feel that it is too soon to jump to conclusions about the outcome of those events.

We are living in a time of great change. With that change comes instability and uncertainty. Once COCOM changes its policies and allows high technology products into the East, we will have lost a great deal in terms of our technological edge if there is a reversal of the policies currently being pursued in Eastern Europe and the Soviet Union. I look forward to hearing from administration witnesses on these new COCOM proposals.

On the positive side, I believe that the Korean Fighter Program could turn out to be a great success story. This sale of 120 F-A/18 aircraft to South Korea will not only greatly increase the defense capabilities of a major ally, but also result in $3 billion in sales and 23 million manhours of labor for U.S. industry. I am hopeful that the recent problems we have encountered in the negotiation of the Memorandum of Understanding for this program will be overcome shortly.

Mr. Chairman, I look forward to hearing from our witnesses.

Senator BINGAMAN. Secretary Yockey, why don't you go right ahead.

## STATEMENT OF DONALD J. YOCKEY, PRINCIPAL DEPUTY UNDER SECRETARY OF DEFENSE FOR ACQUISITION; ACCOMPANIED BY PETER SULLIVAN, ASSISTANT DEPUTY UNDER SECRETARY OF DEFENSE FOR TRADE SECURITY POLICY

Mr. YOCKEY. Thank you, sir.

I would like to state that my remarks will cover most of the Department of Defense's response, and Mr. Rowen will address the Korean Fighter Program, specifically, since that is in his area of expertise.

Before we address the cooperative research and development programs that you asked about in your letter of invitation, I would

like to review for you the objectives of the Department of Defense in cooperating with our allies.

As you know, this administration remains committed to a strong defense. However, we and our allies will be challenged in the 1990s to maintain smaller, but higher quality forces. While the quantitative threat has certainly decreased, the qualitative threat around the world has every indication of increasing.

Moreover, even more efficient weapons will be needed to compensate for the reduced numbers. Consequently, opportunity for cost savings from economies of scale will diminish, at the same time that our equipment's sophistication will increase. This combination can often drive unit costs upward.

We, therefore, view our defense armaments cooperation as one way for the United States and its allies to mitigate the effects of those trends. In the 1990s we and our allies will find it increasingly necessary to cooperate. And while we believe that the need for armaments cooperation is self-evident, circumstances have developed in the past year which tend to mitigate against it. For example, projected and changing force reductions in response to diminishing East-West tensions are creating vast uncertainty in armaments planning, making the cooperations more difficult.

Recently, several cooperative programs have been terminated or delayed by withdrawals of key participants, leading to a sense of pessimism about cooperative development efforts. Finally, budgetary and political pressures are making it more difficult for nations to commit to new cooperative programs, or in some cases, to sustain existing projects.

Nevertheless, we see no suitable alternative to continue our efforts toward more effective and efficient cooperation.

The Reciprocal Procurement Memorandum of Understanding with our allies are a result of the sense of Congress. The Culver-Nunn Amendment to the 1977 Defense Authorization Act, and then the Glenn-Roth-Nunn Amendment to the 1983 Authorization Act, established the policy that the Department of Defense should pursue procurement procedures that would foster NATO Standardization and Interoperability of defense equipment in order to enhance military readiness to NATO.

So, although the focus of these MOUs now goes beyond NATO, our assessment is that MOUs have served the purpose and continue to be in the best interest of our country. However, the environment is changing. Therefore, while the existing MOUs are sound documents, we intend to modify them to better reflect the current economic and military environment.

In spite of the many political and institutional obstacles that have plagued defense armaments cooperation in the past, the 1980s have seen the significant growth in the number and scope of cooperative efforts. Both Congress and the DOD have contributed to this growth by providing new opportunities and impetus.

The Nunn-Warner Amendment is considered the cornerstone of our collaborative efforts. Because these "Nunn projects" must, by definition, target agreed-to areas of critical deficiency, they provide substantial incentive for the United States and allied firms to find common solutions to our most pressing problems.

While the bulk of the Nunn funding is used as "seed money," and is allocated for projects at the early R&D stages, the legislation does promote cooperation at both ends of the development process by funding side-by-side testing.

The Foreign Comparative Testing, also called the Foreign Weapons Evaluation and NATO Comparative Test Program, is significant because it provides foreign manufacturers a direct opportunity to get equipment into the United States defense market.

The congressional support for cooperative programs, which has been illustrated by the Nunn-Warner amendment, has been reinforced by increasingly strong U.S. service support. We have the need to pursue cooperative programs with the allies and to continue to refine the framework that accommodates such cooperation.

Within the Department we are strengthening the requirement to address cooperative opportunities and potential future international sales at each program milestone. The Defense Acquisition Board will be much more inclined to hold up programs that have not identified ways to reduce costs to the U.S. taxpayer through cooperation.

We are also, as I mentioned earlier, engaging our allies across the board to find new ways and new opportunities to cooperate. Our colleagues share the view that we must cooperate if we are to retain a strong defense posture. I am confident that working with our allies we can structure sensible, manageable programs that will be beneficial to all participants.

In doing so, we are going to have to be very realistic about overcoming some of the obstacles to cooperation. Among these are issues of technology sharing and control. We cannot engage our allies if we are unwilling to engage in partnerships that recognize economic realities; and that will mean more technology sharing if we are to be successful.

Regarding technological cooperation with Japan, our staff has been working long and hard on this for several months to achieve a demonstrable benefit to the Department of Defense. A working group was set up last year and includes the appropriate senior DOD acquisition officials. They have reviewed our requirements and compared them to known Japanese capabilities, and we notified the Japan Defense Agency of our plan during Mr. Cheney's visit in February.

Under the umbrella of the Systems and Technology Forum, we agreed in March with the JDA to establish technical working groups to investigate areas of cooperation. These working groups are beginning to meet and will continue to meet. Their recommendations will be reviewed by the Systems and Technology Forum for a final decision and implementation.

We ask the Congress to be a supportive partner, and in some cases a prime mover, if we are to achieve the objectives I set out at the beginning of this statement. We are open to your suggestions, and we most certainly ask your help in achieving the potential of international cooperation in research, development, production and follow-on support of our defense equipment.

Mr. Chairman, in your list of Government policies that affect international trade and cooperation in defense equipment, you asked us about the United States and COCOM system of export

controls. DOD participated fully in the formulation and presentation of the Administration's recent proposals, recently accepted in COCOM, to ease restrictions on "dual-use" items—items with both military and civilian uses, whose export is licensed by the Commerce Department.

To the extent that companies involved in defense trade also export dual-use commodities, such as certain categories of computers, then the proposed easing of licensing restrictions will help facilitate defense trade. However, most of the equipment involved in armaments cooperation, research and development, and defense procurement, is legally classified under the heading "munitions," and the administration has proposed no statutory changes in the rules governing international transfers of munitions, either through government-to-government arrangements, or through commercial sales licensed by the State Department.

Defense has been working closely with State on ways to streamline munitions licensing.

Turning now to the European Economic Integration, or EC-92, economic integration is an imperative for Europeans if they are to remain competitors in the world economy. There are two particular processes involved in economic integration that will have the most direct near-term impact on defense trade in transatlantic armaments cooperation.

First, the EC-92; and second, the defense industry integration efforts of the Independent European Program Group, or the IEPG. Nevertheless, just as events such as the transformation of Eastern Europe and the unification of Germany have shaped the European political and security dialogue, they have also created a degree of challenge and uncertainty for the economic integration process that has been underway for several years.

Although some incremental changes in direction will be inevitable, the forces for greater economic integration and openness within Europe are on an irreversible path. The European Community has set the end of 1992 as a target to unify the European market. European economic integration, however, will be and is an ongoing process, and it will not be completed in 1992. This process encompasses virtually all forms of economic activity. That includes financial markets, industrial product standards, local content rules, health and agricultural regulations, cross-border trade, and Government procurement.

Therefore, EC-92 will affect all aspects of how U.S. firms conduct business in Europe.

On April 16, the President issued his policy on offsets in military exports. This policy is quite similar to longstanding DOD policy. The President's policy is very clear on how we view the offsets. We believe that they are inefficient, that they distort trade, and that they are wasteful of scarce defense resources.

However, the policy also recognizes that offsets are a reality of the international arms market. It is for this reason that the policy continues to leave to industry the decisions about whether to engage in offsets, and how to structure offset deals.

As for the Government, we will not participate in offset deals, nor commit U.S. firms to those offsets.

This policy is quite consistent with all that we have learned about offsets through two surveys of industry and through the preparation of five congressional reports on offsets in military exports. These reports and surveys have consistently shown that the ability to offer offsets is essential to the ability of U.S. industry to win foreign military sales.

They have also shown that despite nominal offset obligation values of as much as 100 to 130 percent of the sales value, the true cost that U.S. industry incurs in providing the offsets are actually quite small. This is because most offsets are implemented through normal activities that industry would undertake anyway for sound business reasons, and because offsets are generally implemented over a longer period of time than the sale itself.

The President's policy also directs the Secretary of Defense to lead an interagency team in consultations with countries that do demand the offsets. Our objective in these consultations is to gain a better understanding of other countries' offset policies and views in order to determine whether there is sufficient common ground to limit the offsets. We hope to convince them that we might all be better off if increasingly scarce defense resources were spent in more efficient ways than on offsets and if defense trade were undertaken on competitive terms.

As I stated earlier, Congress must be a supportive partner, and in some cases a prime mover. We are open to your suggestions, and we most certainly ask your help in achieving the potential of international cooperation.

Thank you very much, sir.

[The prepared statement of Mr. Yockey follows:]

**STATEMENT BY**

**DONALD J. YOCKEY**

**PRINCIPAL DEPUTY UNDER SECRETARY OF DEFENSE**

**FOR**

**ACQUISITION**

Before we address the Cooperative Research and Development programs you asked about in your letter requesting my appearance, I would like to review for you the objectives of the DoD in cooperating with our allies.

As you know, this Administration remains committed to a strong defense. However, we and our allies will be challenged in the 90s to maintain smaller but higher quality forces. While the quantitative threat has certainly decreased, the qualitative threat around the world has every indication of increasing. Moreover, even more efficient weapons will be needed to compensate for reduced numbers. Consequently, opportunity for cost savings from economies of scale will diminish at the same time equipment sophistication increases. This combination often could drive unit costs upward.

We therefore view defense armaments cooperation as the best way for the U.S. and its allies to mitigate the effects of these trends. In the 90s we and our allies will find it increasingly necessary to cooperate to accomplish, simultaneously, the following:

- Modernization of forces
- Reduction of defense costs in a climate of increasingly constrained resources
- Maintenance of our defense industrial base
- Maximization of the use of our national strengths and offset of budgetary weaknesses through the specialization of efforts and forces.

While we believe that the need for armaments cooperation is self evident, circumstances have developed in the past year which tend to mitigate against it. For example, projected and changing force reductions in response to diminishing East-West tensions are creating vast uncertainty in armaments planning, making cooperation more difficult. Recently, several cooperative programs have been terminated or delayed by withdrawals of key participants, leading to a sense of pessimism about cooperative development efforts. Finally, budgetary and political pressures are making it more difficult for nations to commit to new cooperative programs, or, in some cases, sustain existing projects. Nevertheless, we see no suitable alternative to continued efforts toward more effective and efficient cooperation.

By cooperating with our allies the U.S. seeks to maintain adequate warfighting capabilities as well as to achieve cost savings in the development, production, and follow-on support of military equipment. Stated Department of Defense objectives for defense armaments cooperation are:

- Access to, use of, and protection of the best technology developed by our allies, and comparable allied access to, use of, and protection of the best U.S. technology, thereby avoiding unnessary duplication of developments.
- Deployment and support of common - or at least interoperable - equipments with the allies.
- Economies afforded by coordinated research, development, production and logistic support programs.

As I have stated, allied cooperation leading to the rationalization, standardization and interoperability of weapon systems and equipment reduces duplication and waste in a way that can allow us to address conventional force capabilities and reduced budgets. For example, cooperation allows for the technical specialization and market size and scope that helped make products such as the F-16 such a competitive product in international markets. In short, we must make better use of defense dollars, marks, yen, guilders, lira, and pounds.

In meeting the challenges of the 90s, the Department of Defense will continue to explore all potential venues of cooperation including the following:

- Continue to participate in activities of NATO organizations such as the Conference of National Armaments Directors (CNAD), the Senior NATO Logisticians Conference (SNLC), the NATO Standardization Group, the NATO Air Defense Committee (NADC) and the NATO Maintenance and Supply Agency (NAMSA) which have as their focus increased efficiency and effectiveness.

- Support use of the NATO Conventional Armaments Planning System (CAPS) to focus Alliance leadership on cooperative opportunities and take the necessary policy decisions to move forward on cost-effective common efforts.

- Propose cooperative research and development projects to the allies to address critical deficiencies and invite the allies to propose such projects to the U.S.

- Define and evaluate cooperative opportunities at each stage of an equipment acquisition program.

- Seek opportunities to acquire equipment already developed and fielded by our allies as an alternative to national development programs.

- Promote allied acquisition of U.S. equipment where it appears to be the most economical and cost effective way to modernize allied forces.

The Reciprocal Procurement Memoranda of Understanding with our allies are a result of the sense of Congress. The Culver-Nunn Amendment to the 1977 Defense Authorization Appropriations Act and then the Glenn-Roth-Nunn Amendment to the 1983 Authorization Act established the policy that the Department of Defense should pursue procurement procedures that would foster NATO Standardization and Interoperability of defense equipment in order to enhance military readiness in NATO. Although the focus of these MOUs now goes beyond NATO, our assessment is that the MOUs have served this purpose and continue to be in the best interest of our country. However, the environment is changing. Therefore, while the existing MOUs are sound documents, we intend to modify them to better reflect the current economic and military environment.

These MOUs are bilateral national security agreements whose basic principle is that each party will waive buy-national restrictions in order that military readiness will be enhanced. DoD believes that these MOUs have contributed to the achievement of important political and military objectives. They have served as the underpinning for armaments cooperation, including collaboration in the research, development and production of specific defense programs. They have contributed to the operational effectiveness of U.S. and allied forces as a result of the standardization and interoperability achieved through common programs, and they have served as a statement of our will to expand armaments cooperation with our allies.

Although we consider the MOUs to be a success, we continue to work to achieve comprehensive reciprocity in these MOUs so that they establish procedural requirements, like those we use in the U.S., guaranteeing equal treatment for all potential suppliers. For example:

- Specify that each country will publicize its procurements in a form available to the industry of the other;

- Specify that each country will provide sufficient time for industry to respond to publicized procurements and solicitations;

- Specify procedures for obtaining redress of meritorious grievances:

- Reciprocally waive customs and duties and the consideration of duties in the evaluation of offers;

While the essential purpose of these reciprocal MOUs is to promote our national security, we are mindful of their impact on the economic interests of the United States. DoD is consulting with the United States Trade Representative and the trade policy interagency process in the implementation of these MOUs and will do so on any modifications to these MOUs.

In spite of the many political and institutional obstacles that have plagued defense armaments cooperation in the past, the 80s have seen the significant growth in the number and scope of cooperative efforts. Both Congress and the DoD have contributed to this growth by providing new opportunities and impetus.

For example, let me address the matter of the Cooperative Research and Development programs, better known to all of us as the "Nunn-Warner Amendment Programs."

The Nunn-Warner Amendment is considered the cornerstone of our collaborative efforts. Because these "Nunn projects" must by definition target agreed-to areas of critical deficiency, they provide substantial incentive for U.S. and allied firms to find common solutions to our most pressing problems. While the bulk of the Nunn funding is used as "seed money" and is allocated for projects in the early R&D stages, the legislation promotes cooperation at both ends of the development process by funding side-by-side testing. The Foreign Comparative Testing (Foreign Weapons Evaluation and NATO Comparative Test) program is significant because it provides foreign manufacturers a direct opportunity to get equipment into the U.S. defense market.

The Congressional support for cooperative programs illustrated by the Nunn-Warner Amendment has been reinforced by increasingly strong U.S. Service support. We have the need, as I have previously stated, to pursue cooperative programs with the allies and to continue to refine the fremework that accommodates such cooperation.

However, recent failure of some of our cooperative development programs has perhaps masked the substantial progress the Nunn-Warner Amendment achieved in the past few years. We have learned a great deal about the possibilities and problems associated with initiating and managing cooperative R&D programs. Moreover, we have developed the precedents and procedures essential if cooperation is to become a mainstream activity. We have trained numerous people in cooperative program management--many more than would have been exposed to such programs had we not had the Nunn-Warner Amendment and the appropriations that accompanied it. We have accomplished some very useful work at substantial savings to the U.S. taxpayer through sharing costs with our allies.

In four plus years DoD has certified 83 potential programs as meeting the criteria for Nunn-Warner funding. Considerable progress has been made with 37 percent of the certified programs under contract; 46 percent of the certified programs have signed government-to-government Memoranda of Understanding; an additional 19 percent are in negotiation; and, 29 percent were dropped--almost all of those prior to expenditure of any U.S. funds.

However, it has not been an unqualified success. We faced problems from the outset:

- Nunn-Warner Amendment money tended to attract marginal programs. Program Managers confident of their ability to obtain all needed funds from Congress for their program--because it enjoyed a solid priority place in the U.S. requirement scheme--were not motivated to seek cooperation and Nunn funds with all the attendant complications of initiating and managing an international program. The

incentive to seek Nunn funds was strongest where programs were weakest and under-funded. Even worse, two programs which were "warfighting" in nature, were terminated in FY89--Modular Standoff Weapon System and the 155mm Autonomous Precision Guided Munition.

- Nunn-Warner Amendment programs, because of the nature of the appropriations, were managed separately from normal PPBS procedures. That situation caused international programs to be viewed as something extraordinary and not central to the Department's mission.

These problems have not been solved, and perhaps have been exacerbated in the past year. We do not appear to have the clear support of the Congress when it comes to appropriating the funds. For example, in the last two appropriation cycles we have been increasingly constrained in the Department's use of the funds. This has had the effect of discouraging the Military Departments' use of the funds, and has forced us to attempt some unrealistic--and to our mind--unnecessary projects. Thus, DoD finds itself being pressed by the Authorization Committees to pursue a small number of larger, substantive programs, and being challenged by the Appropriations Committees to pursue designated smaller programs at the expense of larger programs such as the 155mm APGM. This is not good management. In addition, recent legislation now requires us to submit the text of MOUs before they are signed.

Perhaps it is time to consider a new approach. While the cooperative research and development projects we have undertaken with the Nunn-Warner funds will save the taxpayer money and promise to deliver needed products, they have not, with noteable exceptions, been projects central to the needs of the nation's defense.

Our aim should be to achieve cooperation and cost savings in programs that have our highest priority--not our lowest. The incentive is certainly there as our defense resources diminish. The question is "how"?

Within the Department, we are strengthening the requirement to address cooperative opportunities and potential future international sales at each program milestone. The Defense Acquisition Board will be much more inclined to hold up programs that have not identified ways to reduce costs to the U.S. taxpayer through cooperation.

We are also, as I mentioned earlier, engaging our allies across the board to find new ways and new opportunities to cooperate. Our collegues share the view that we must cooperate if we are to retain a strong defense posture. I am confident that working with our allies we can structure sensible, manageable programs that will be beneficial to all participants.

In doing so, we are going to have to be very realistic about overcoming some of the obstacles to cooperation. Among these are issues of technology sharing and control. We cannot engage our allies if we are unwilling to engage in partnerships that recognize economic realities, and that will mean more technology sharing if we are to be successful.

Regarding technological cooperation with Japan, the U.S.-Japan Systems & Technology Forum (S&TF) was established ten years ago under the chairmanship of the Deputy Under Secretary for International Programs and Technology. A working group chaired by the Assistant Deputy for International Development & Production Programs was set up last June and now includes appropriate OSD and DARPA representatives, senior acquisition officials from the three military departments, and the Strategic Defense Initiative Organization. Our primary objective is to pursue activities which will deliver components, assemblies, and manufacturing processes applicable to near and mid-term Service requirements in order to save valuable development time and money. The working group has reviewed our requirements, compared them to known Japanese capabilities, and we notified the Japan Defense Agency of our plan during Mr. Cheney's visit in February.

The JDA formally proposed five technological areas for potential cooperation at the October 1988 S&TF meeting in Tokyo. In February 1989, the U.S. co-chairman replied

formally that DoD was interested in two of the areas. Since then we have added a third to our discussions with the JDA.

During visits by senior JDA officials in February and March of this year, we agreed to establish technical working groups (TWG) under the S&TF to investigate the technologies now being considered for cooperation. Other TWGs will be established as other areas come under consideration. These are beginning to meet and will continue. Their recommendations will be reviewed by the S&TF for a final decision and implementation or termination.

Congress must be a supportive partner, and in some cases a prime mover, if we are to achieve the objectives I set out at the beginning of this statement. We are open to your suggestions and we most certainly ask your help in achieving the potential of international cooperation in research, development, production and follow-on support of our defense equipment.

Mr Chairman, in your list of government policies that affect international trade and cooperation in defense equipment, you asked about the U.S. and COCOM system of export controls.

COCOM, the Paris-based Coordinating Committee whose membership includes the NATO nations (minus Iceland) plus Japan and Australia, was established in 1949 to prevent the acquisition by potential adversaries of technology and equipment with vital military applications.

Although COCOM maintains embargo lists of both nuclear related and military items, it is a third "dual-use" list -- covering items with both military and civilian uses whose export is licensed by the Commerce Department -- that has been the subject of the President's recent proposals. To the extent that companies involved in defense trade also export dual-use commodities, such as certain categories of computers, then the proposed easing of licensing restrictions will help facititate defense trade. However, most of the equipment involved in armaments cooperation, research and development, and defense procurement is legally classified under the heading "munitions", and the Administration has proposed no statutory changes in the rules governing international transfers of munitions either through government-to-government arrangements or through commercial sales licensed by the State Department. Defense has been working closely with State on ways to streamline munitions licensing.

Let me start the subject of the Korean Fighter Program by emphasizing that this program is a co-production program rather than a co-development program like the Japanese FSX. From the beginning, there was an unprecedented level of cooperation between the Department of Defense and its colleagues at Commerce. The consultation was continuous and both parties listened to and coordinated each other's views.

As for details, the basic program structure is in three phases, covering 120 aircraft, with a potential for follow-on procurements. It is a combination of government-to-government (FMS) and commercial (limited licensed production) transactions:

Phase I is for 12 aircraft off-the-shelf (FMS) and will include some limited amount of Korean content;

Phase II is for 36 aircraft in kit form (FMS) with limited Korean content and assembly in Korea;

Phase III is for 72 aircraft from limited licensed production (commercial) but with a significant content of items which will continue to be bought via Foreign Military Sales (FMS). We call these items the FMS-must list.

Just looking at the basic program, with limited licensed production it has a value of about $3.0 billion in 1989 dollars. This compares with the value of a 120 aircraft off-the-shelf

program of about $3.4 billion. This $3.0 billion program will benefit over 1500 U.S. suppliers. Our best estimate is that the program will bring in over 23 million man-hours of work for the U.S. aerospace industry.

We recognized a need to do two things in order to assure protection of technology and to preserve a high U.S. work share content:

First, we had to make sure that we were able to protect classified and sensitive sub-systems, systems and processes. To this end, we consulted with the Air Force, the Navy and the Defense Technology Security Administration and then established the FMS-must list. It covers key software support, avionics sub-systems -- (the radar warning receiver, IFF, ECM, radar), sensitive engine components, explosives and weapons. These elements must be purchased on a government-to-government basis. It should be noted that by reserving the portions of the engine, avionics sub-systems and software support for U.S. sub-contractors we ensure that our more sensitive technologies and industrial processes are protected.

Second, we had to preclude having the customer economically rationalize the establishing of a new industry by forcing the winner of the fighter competition to buy-back co-produced or licensed produced parts. This led to our no-directed-buy-backs policy. In plain terms this means that if the Koreans choose to build 120 widgets for their own program plus 20 spares, they have to make the tough economic and business decision that it is worthwhile to build the infrastructure, to buy the unique tooling, to train the work force, and so on -- when there is no assured follow-on market. This policy was designed to protect both the prime contractor and the myriad of subcontractors.

Let's look for a moment at what we get out of the program as we have it currently structured. First the program is very important in producing economies of scale and continued work on the F/A-18 production line. Concurrently, it also means work for the contractor's 1500 sub-contractors, which will extend well into the next century given the follow-on support needs associated with the program. From a different angle, the sale represents additional access to the aerospace market in the Pacific Rim -- this is particularly critical with respect to the commercial market.

From a military perspective, we get the obvious military benefits of seeing new fighters flow into the force structure of a key Northeast Asian ally, and finally, it is quite likely that Korea will wish to follow this program with co-production of an up-to-date derivative of the F/A-18.

Concerns expressed about this program have centered on such topics as why this should not be a total off-the-shelf buy, whether the offset program is excessive, whether or not we are setting the Koreans up as a competitor in the aerospace industry, and whether we can expect Korean compliance with the MOU which we negotiate.

First, Mr. Chairman, the idea of an all off-the-shelf buy was thoroughly vetted in the new administration. Both Secretary Cheney and Secretary Mosbacher have thoroughly reviewed this program and each has discussed the possibility of an off-the-shelf buy with appropriate Korean officials. After review of all aspects of the program, including the high U.S. content, the limited amount of technology transfer, Korean desires for co-production work, and the military value of the program, both secretaries have concluded that the current program structure protects and promotes the interests of the United States.

Regarding offsets, there was a point in time during the competition between General Dynamics and McDonnell-Douglas when it appeared that the offsets would be excessive. The Koreans started the competition with an offset requirement of 60% of the contract value of the program. As the competition intensified, both contractors raised the ante and eventually ratcheted each other up past the 100% offset mark. We took quite some time to come to grips with the problem, because, as you know, we generally do not directly intervene in sales competitions. But, we eventually decided that this situation was getting out of hand. After full discussions between DoD and Commerce, and consultations with the contractors, we decided to raise this issue with the Koreans. Both Secretary Cheney and Secretary Mosbacher

became personally involved in convincing the Korean Government that the offset program must be capped at 30% of contract value. The Korean Minister of Defense agreed to this in a letter to Secretary Cheney.

One might speculate that Korea's ultimate objective is to achieve a self-contained areospace industry capability. There are some disagreements within the community as to whether this will ever be possible, but there is unanimity of opinion that this program alone will not make it possible. The ROK aircraft industry already manufactures certain products, mostly airframe components for Airbus, Boeing and McDonnell-Douglas commercial aircraft, the center fuselage section for the F-16, and a few components for the F-18.

This program will improve their capability to manufacture items associated with airframe manufacturing, as well as manufacturing non-sensitive parts of the engine. It will do little or nothing to enhance their capabilities to manufacture major items of avionics equipment (these are on the FMS-must list), and will do nothing to enhance their ability to develop their own aircraft.

Finally, I want to address the subject of MOU compliance by Korea, especially in the third-country transfer area. We believe that the danger of illicit third-country transfer is remote for this program. I do not expect third-country sale of the aircraft itself, because of its high dependence on the supply of major U.S. components. I also believe that the danger of illicit third-country sale of F/A-18 parts is remote, even if the Koreans were so inclined, and I hasten to add that I do not think that they would be. The Koreans will not be in a position to manufacture anywhere near all of the spare parts needed to support their own aircraft, let alone to provide a full range of spare parts support to other F/A-18 users. Given that these users are Australia, Canada, Kuwait, Spain, and possibly Switzerland -- and the U.S. -- this is hardly the type of market that I think the Koreans could penetrate, even if they wanted to. I might add that this program is much more analogous to the current M109 Howitzer co-production program, for which we have had no reports of illicit third-country marketing, than it is to the M-16 rifle.

Notwithstanding our view on the improbability of illicit transfer, the management structure, which we have planned to set up for the program will include requirements for a Navy Weapons System Liaison Office to be located in Korea during the life of the production run. It actually is more than a liaison office, since it will provide program management advice and assistance to the Koreans. We will also assign it an MOU compliance function. The office will be there and fully staffed as long as the production line is running, and probably afterwards if our experience in Spain and Australia is any indication.

Turning to European Economic Integration or EC '92, economic integration is an imperative for Europeans if they are to remain competitors in the world economy. There are two particular processes involving economic integration that will have the most direct near-term impact on defense trade and transatlantic armaments cooperation: First, EC '92 and second, the defense industry integration efforts of the Independent European Program Group (IEPG). Nevertheless, just as events such as the transformation of Eastern Europe and the unification of Germany have shaped the European political and security dialogue, they have also created a degree of challenge and uncertainty for the economic integration process that has been underway for several years. Although some incremental changes in direction will be inevitable, the forces for greater economic integration and openness within Europe are on an irreversible path.

The European Community has set the end of 1992 as a target to unify the European market. European economic integration, however, will be and is an ongoing process -- it will not be completed in 1992. This process encompasses virtually all forms of economic activity (e.g., financial markets, industrial product standards, local content rules, health and agricultural regulations, cross-border trade, and government procurement). Thus, EC '92 will affect all aspects of how U.S. firms conduct business in Europe.

The U.S. Government has long supported greater European economic integration as a means of promoting efficiency and expanding global markets. Developments to date indicate

that, on balance, the EC process is moving in the direction of more open markets. Member states have demonstrated flexibility in accommodating in final directives concerns expressed by business interests and non-EC trading partners.

U.S. backing for European economic integration has stemmed partly from our belief that it would enhance our security by promoting Western Europe's prosperity, stability, and ability to contribute to its own defense. We are concerned, however, about the transition toward this more open Europe -- that is, we are not going to bear the burden of the economic dislocations inherent in this transition.

Because European economic integration will touch every facet of economic activity, there will be implications for how DoD and the U.S. defense industry conduct business in Europe. For example, a simplified and harmonized regulatory system will directly benefit U.S. forces' logistics and local procurements in Europe. As well, standardized markets for U.S. dual-use components and some defense items will emerge. On the other hand, the lowering and eventual removal of internal border controls could pose challenges for certain U.S. security interests such as counterterrorism activities and technology transfer administration. With regard to technology transfer, there are currently no specific proposals within the EC, although we expect that the Commission will eventually propose some sort of centralized administrative mechanism as border controls are removed. There is also no evidence that the EC is looking to substitute itself for member states in the COCOM process.

In short, as the EC '92 process continues to unfold, specific issues will emerge that require attention and action. The Administration has organized an interagency coordination process headed by USTR (with DoD participation) that seeks to make sure that the agency with the relevant charter and contacts is aware of and engaged in dealing with EC '92 issues. This has proven to be a very effective means for influencing the EC '92 process.

Market liberalization and deregulation that is occurring with economic integration under the EC '92 process is already affecting the way defense firms do business in Europe. Although consensus among the member states concerning the EC's role in security-related matters has not yet been reached, we have seen some testing of these waters in the context of a proposal to limit member states' power to waive the common external tariff on defense imports from outside the community. Although this proposal was recently postponed indefinitely (partly in response to concerns raised by DoD and other U.S. agencies), language in this proposal regarding the creation of a Europe-wide defense industry as part of the EC's broader industrial policy may be indicative of the EC Commission's views on defense procurement.

We expect that much of the European approach to the defense trade aspects of EC '92 will be a direct result of activities of the Independent European Program Group (IEPG). The IEPG is comprised of the defense ministers of the European members of NATO (less Iceland). Although the IEPG has existed for years, it has only recently become more active in promoting European defense integration.

At the end of 1988, the IEPG adopted an Action Plan designed to make European defense industry more efficient and to harmonize defense procurement practices. Four areas were targeted for specific action:

(1) Improving cross-border competition by making defense procurement more open and transparent.

(2) Juste Retour (e.e., offsets), a concept as yet not defined but which generally calls for equitable sharing of contract opportunities among IEPG members over time.

(3) Research and Technology Cooperation through more centralized planning and prioritization of projects.

(4) Greater assistance to lesser-developed defense industry countries as part of the broader NATO initiative in this area.

Although the IEPG has been very slow to implement their action plan, DoD is working to influence IEPG directions in a variety of ways -- through the CNAD, through ad hoc meetings with IEPG officials, and through informal working-level consultative mechanisms.

In summary, European economic integration is part of a series of developments in our relationship with Europe that will become increasingly linked. The perceived reduction in the threat from the East, some European states' enthusiasm for broader cooperation with the East Bloc, uncertainties created by the emergence of new democracies and a unified Germany, and continuing non-defense trade frictions will all play a role in the emerging identity-searching going on in Europe. This will clearly have implications for how the Alliance evolves and for how we structure our security policy. Although NATO will remain a major forum for engaging our allies on security issues, we intend to use all available channels to ensure that European-only armaments initiatives do not proliferate or become barriers to transatlantic security relations and defense trade.

On April 16, the President issued his policy on offsets in military exports. This policy is quite similar to longstanding DoD policy. The President's policy is very clear on how we view offsets. We believe that they are inefficient, that they distort trade, and that they are wasteful of scarce defense resources. However, the policy also recognizes that offsets are a reality of the international arms market. It is for this reason that the policy continues to leave to industry the decisions about whether to engage in offsets and how to structure offset deals. As for the government, we will not participate in offset deals, nor commit U.S. firms to offsets.

This policy is quite consistent with all that we have learned about offsets through two surveys of industry and through the preparation of five Congressional reports on offsets in military exports. These reports and surveys have consistently shown that the ability to offer offsets is essential to the ability of U.S. industry to win foreign military sales. They have also shown that despite nominal offset obligation values of as much as 100 and 130 percent of the sales value, the true costs that U.S. industry incurs in providing offsets are actually quite small. This is because most offsets are implemented through normal activities that industry would undertake anyway for sound business reasons, and because offsets are generally implemented over a longer period of time than the sale.

The President's policy also directs the Secretary of Defense to lead an interagency team in consultations with countries that demand offsets. Our objective is these consultations is to gain a better understanding of other countries offset policies and views in order to determine whether there is sufficient common ground to limit offsets. We hope to convince them that we might all be better off if increasingly scarce defense resources were spent in more efficient ways that on offsets, and if defense trade were undertaken on competitive terms.

Although not directly within this subcommittee's purview, I would like to briefly discuss the offset proposals in S. 1379, the proposed amendments to and reauthorization of the Defense Production Act. First, the bill would require that industry notify the Commerce Department of offset deals valued at more than $5 million. This is an unnecessary, and indeed, useless burden to impose on industry and the Executive Branch. As we already know, every offset is a unique deal, with unique terms and conditions. Learning the nominal value of an offset commitment tells us nothing about the true measure of economic activity taking place as a result of the terms and conditions under the commitment. As I mentioned, we have already conducted two surveys and five analyses, which have told us far more than we could ever hope to learn from these reporting requirements.

Second, I do not see the need for continuing the annual offset reporting requirement under section 309 of the DPA, let alone expanding it or transferring its administration from one agency to another. The results of the first five reports show that even under worst case assumptions, sales associated with offsets produce greater economic benefits for U.S. industry

than the alternative, which is no sales at all. At a time of shrinking defense resources, we should be looking for ways to trim reporting costs imposed on defense industry and on government.

Finally, while we are pleased to see that the sponsors of S. 1379 support the President's policy on offsets, there is no need to codify the policy in law. If we start casting every Presidential policy in the stone of law, we only inhibit the President's flexibility to adjust to changing circumstances and to execute his constitutional responsibilities.

As I stated earlier, Congress must be a supportive partner, and in some cases a prime mover. We are open to your suggestions and we most certainly ask your help in achieving the potential of international cooperation.

Senator BINGAMAN. Thank you very much. Secretary Rowen, why don't you go ahead?

## STATEMENT OF HON. HENRY S. ROWEN, ASSISTANT SECRETARY OF DEFENSE (INTERNATIONAL SECURITY AFFAIRS)

Mr. ROWEN. Very briefly, Mr. Chairman, on the Korean fighter program. The U.S. security assistance program in South Korea and South Korean affairs are within the purview of my office.

As you know, we are currently working on an agreement with the Republic of Korea on the F/A-18 aircraft. I want to emphasize that this is a co-production agreement; it is not a co-development program, as is the case with our FSX agreement with Japan.

Under the KFP program, Korea would acquire a total of 120 F-18s in 3 phases. In Phase 1 they will purchase 12 F-18s off the shelf. In Phase 2 they will buy 36 aircraft in the form of kits from the United States and assemble them in South Korea. In Phase 3 they will engage in limited licensed production of 72 additional F-18s.

American security interests, including the U.S. defense technology base, are well served by this program. South Korea is a front-line state, facing constant threats from a hostile and rigid regime 30 miles north of Seoul.

There was no debate about whether or not Korea needs enhanced air capabilities nor about the desire to have Korea buy American equipment. The question centered on our own ability to protect and strengthen the U.S. lead in aerospace. This, I believe, we did well with full coordination and support from the Department of Commerce.

We have established the FMS-must list which dictates that sensitive avionics and engine technologies must be bought from the United States. It also ensures that sensitive industrial processes and techniques are protected.

Second, we have formulated a no-directed-buy-backs policy. This means that our manufacturers are not obligated to buy back parts made in South Korea to go into the F-18s made for the United States or any other nation.

Thirdly, the program provides work for about 1,500 subcontractors for the 30-year life of the aircraft. In the immediate term, it helps reduce the unit cost of the Navy's F-18s and extends the McDonnell Douglas production line by 3 years. The program will

also bring over $3 billion in defense export sales to our balance of trade.

Last but not least, this program embodies the kind of productive cooperation we have between the Defense Department and the Department of Commerce. Both Secretaries Cheney and Mosbacher have been personally involved. For example, they worked together to convince the Korean Government to roll back offsets from 100 percent to 30 percent.

Mr. Chairman, I would like to conclude by stating we believe the Korean fighter program is a winner. It is a winner for our strategic interests in Southeast Asia and it is a winner for our aerospace industry at home.

Thank you, Mr. Chairman.

Senator BINGAMAN. Let me start with a question to Secretary Murrin, if I could. First, I want to compliment you on the report that the Technology Administration of the Department of Commerce issued on emerging technologies. I thought it was an excellent report and is a good complement to what DOD has been trying to do with its critical technologies reports that this subcommittee has been directing be prepared each of the last couple of years.

Particularly I am struck by Appendix C to your report, which compares the so-called emerging technologies that Commerce has identified with the critical technologies that have been identified by the Department of Defense and finds a very substantial overlap in those.

I guess my question is not on the technology study itself, because we have a provision in the law now which tries to obtain from the Office of the President's Science Advisor, OSTP, a combining of the defense and non-defense technology areas and a national critical technologies report, which we hope will be prepared and submitted this fall.

What I am interested in is another requirement we put in the law. We asked DOD this last year to prepare, in addition to the critical technologies report, a so-called critical industries plan, and we asked them to give us by the 15th of March of this year, now 3 months ago, a report on those industries that they felt were essential for the United States to be able to take its so-called critical technologies and actually use them in the development of weapons systems or the maintaining of national security.

We do not have that as of yet. We are informed that they are still working on that. I guess my question to you is what do you see that the Department of Commerce could do to help us zero in on this set of issues—this question of what are the critical industries that will be needed in the future to actually apply critical technologies or emerging technologies to the benefit of the country.

If you have any thoughts on that, as to what Commerce is doing in that respect—you mentioned a couple of studies that are going on—or what you think Commerce could be able to do in the next year or so, I would appreciate it.

Mr. MURRIN. Well, thank you, Mr. Chairman. Let me comment from the Commerce perspective and then briefly from my earlier role on the Defense Manufacturing Board, and then perhaps it would be appropriate for Secretary Yockey to comment, since you made reference to DOD repeatedly.

As you mentioned, we have recently issued the second version of the emerging technologies survey. We are greatly heartened, frankly, that it not only engendered throughout the administration and the Congress and across much of the country a great deal of increased interest in the subject, but we are also pleased that most of the folks who have taken the effort to look at it very carefully, as obviously you have, seem to think that it is really well done and provides some invaluable insights.

We have, as you noted, gone to the effort to test its compatibility with other Government-related reports, most notably the one recently provided by the Department of Defense and, as you have just observed, there is a great deal of overlap of compatibility in the two studies.

Additionally, we are participating with Dr. Alan Bromley and his people in helping to have OSTP respond fully to your request in this same field.

I think in general all of this is making the matter of key technologies and key industries a much higher priority issue in government and in industry, and it is my own perception that this of itself is very valuable and holds considerable promise for the future.

As to the critical technologies report that you made reference to, I was privileged to chair the Defense Manufacturing Board when that effort was initiated. I was very pleased that Secretaries Atwood and Betti endorsed my recommendation as I was departing from that role when, as you know, the Manufacturing Board and the Science Board were merged. I was pleased that they agreed to have that study completed.

Frankly, I have lost track of the specifics. I am not privy to exactly where that stands. I expect Secretary Yockey or others can comment on that and I think that might be appropriate.

But again we at Commerce are anxious to participate in these evaluations. We think this is a very, very important subject and they all serve to reinforce an array of recommendations that the Administration, as you well know, has made regarding matters like capital, education, intellectual property rights, and one that may be particularly germane to this subject, the recommendation, jointly made by our Secretary and Attorney General Thornbourgh, to clarify and update the antitrust laws to allow for production consortia, because, at least in my view, that might aid very significantly in allowing us in some of these key segments to make our remaining manufacturing capabilities much more competitive.

But if I may take the liberty of sort of passing the ball to my good friend and colleague, Don Yockey, to pick up on your questions regarding the critical industries report, Mr. Chairman.

Senator BINGAMAN. Secretary Yockey, do you have anything to add?

Mr. YOCKEY. Yes, sir. First, I might say that I am real pleased to see that Mr. Murrin is here with us. Tom and I have known each other a number of years and we both found out a few days ago that we used to be competitors and now we find ourselves working on the same team. So it is going to be a pleasure working with Secretary Murrin and the Department of Commerce.

The critical industry report is being worked in our production and logistics office. It is tied in, of necessity, to broader studies that we have under way in the total question of our defense industrial base, which is part of our DMR programs.

I will look into it specifically and see if I can find out a specific date when it will be forwarded to you.

But fundamentally we are concerned, of course, with the critical industries and our defense industrial base as it applies to defense procurement and defense acquisition. We are concerned with it not only at the prime contractor level, but also at the subcontractor level and the component level.

At the component level, of course, we have been aware of a number of the critical technologies and, along with that, obviously, the critical industries, particularly in semiconductors and a lot of our endeavors in DARPA are directed towards that end of shoring that up. There are certain subcontractors that are critical to our various programs, ranging from shipbuilding to aircraft production to tanks and our whole inventory of weaponry.

Then of course at the prime level, we are very much concerned about maintaining our industrial base. Some of those components within the prime and subcontract level are critical to us.

So hopefully we will be able to answer those questions for you very shortly, and I will get back to you as soon as I can to let you know when the report will be completed and forwarded to you.

Senator BINGAMAN. Thank you. My time is up. Senator Wallop.

Senator WALLOP. Thank you, Mr. Chairman.

Let me pursue that a little further if I may, Mr. Yockey. It is my understanding that despite what appears to be the disintegration of the Warsaw Pact that there remains a considerable amount of cooperation between the intelligence units of some of those countries and the Soviet Union to this day. That gives me concern, frankly, as to the high probability of diversion of technology to the Soviet Union as we relax these export controls on products being sold into Eastern Europe.

Mr. Murrin can comment on this, too. What guarantees do we have in the new COCOM proposals that such diversions will not take place?

Mr. YOCKEY. I would like to, if I may, sir, since Peter Sullivan is our COCOM expert and he is here with us today, call on him to answer that question.

Senator WALLOP. By all means.

Mr. SULLIVAN. The administrations proposal that we worked on developing with Congress and the State Department had as a fundamental element the principle of differentiation; that is, we considered the Soviet Union to present a significantly greater threat to our interests and those of our allies than certain of the emerging democracies in Eastern Europe. The proposal that we presented and which was agreed to recognized the lesser risk presented by the Eastern Europeans and proposed higher levels of technology to those countries determined to have instituted necessary safeguards and made the appropriate commitments to safeguard technology.

There obviously is a continuing threat, but under the circumstances and under the approach that we expect to be implemented, we think the risks can be made to be manageable. We have had

Eastern European countries come to us willing to institute the necessary systems to provide personnel and to provide the technology safeguards, including on-site inspection by COCOM country nationals.

They are also undertaking to discontinue participation in any kind of official illegal acquisitions. It is a situation that we would consider from an overall threat point of view significant improvement over the status quo as of a year ago or several months ago and something that we think is the basis for the differential treatment.

Senator WALLOP. If I may say so, I do not think I feel very reassured. I mean, a united agreement not to participate in illegal actions is sort of strange. What are we doing, in the intelligence arena and otherwise, to determine the level of cooperation between former or existing elements of national intelligence services of these countries and the Soviet Union? I mean, on-site inspection is not going to help you a great deal if you have the level of cooperation that has existed in the past.

What are we doing to try to determine whether this level of cooperation exists and to try and minimize the risk?

I confess, I really did not understand your answer.

Mr. SULLIVAN. In an open session I cannot give the kind of detailed answer that your question obviously is looking for as I could in a far more detailed briefing and explanation. Briefly stated, if I can make a distinction, on the one hand we are talking about first a level of technology for possible export to qualified East Europeans through normal legal channels. This is an area where even past experience indicates that the risk can be made to be manageable, particularly when there is an openness to pre- and post-license inspections. That is something where I think at least past practice gives us some comfort.

If you are concerned about possible continuation of operations in these countries by hostile services, which is something that is reasonable to posit, then on the one hand the lack of official cooperation and collaboration in those kinds of activities is a significant plus from our point of view, since in the past the situation was quite to the contrary where you had governments actively and aggressively participating in those kinds of activities.

Senator WALLOP. In the past, we sold them nothing and did not offer to sell them anything.

Mr. SULLIVAN. In the past there has been a different order of magnitude. Obviously, before the events of the last several months we had always provided on a case-by-case basis a greater level of technology for East Europeans, particularly when they were accompanied by safeguards.

Mr. ROWEN. May I add something, Senator? I think it is important to recognize the fact that these governments are undergoing really profound changes. It is very clear what is happening to them. They are changing from Communist systems, which were tied to the Soviet Union with the possible exception of Romania and Bulgaria, to truly democratic systems that want to have nothing to do with Communism and that want to decouple themselves from the Soviet Union. They are telling the Soviet forces to go home in the case of Czechoslovakia and Hungary. It is taking them

a while to root out the institutions and the people that were involved in these various practices. This does not happen overnight. They are in the process themselves of discovering how deeply embedded and how pervasive these various agencies were.

I think we can have a lot of confidence in the political character of these countries, but it is taking time for them to demolish these institutions, and recruit better people. It is a bet, in a way, that that is going to work. I think we have a basis for confidence that that is going to work in these democracies. They do not want to pass on weapons technology to the Soviet Union. They clearly do not. It will take some months, I am sure, maybe several years, to get it wholly sorted out, but I think the thrust is very clear.

Senator WALLOP. Mr. Chairman, I am perfectly willing to accept the good faith of a number of governments. It is their ability to control these things that ought to be concerning us. I think, as Secretary Rowen points out, in many instances those who have replaced their former Communist leaders have no idea how pervasive the internal intelligence agencies are.

Mr. ROWEN. They are finding out.

Senator WALLOP. They are finding out, but it just seems to me that a little prudence and a slower pace is in order.

Senator BINGAMAN. Let me get back to this emerging technologies report for just a moment and ask both Secretary Yockey and Secretary Murrin about the issue.

One of the interesting charts in here is the U.S. report card trends on (x)(iii) of this emerging technologies report. Basically as I read that, the conclusion of the Department of Commerce is that of the 13 emerging technology areas the United States is losing, or is losing badly relative to the Japanese in 10 of the 13 areas. That is somewhat consistent with the critical technologies report of the Department of Defense, although they did not have a trend graph like this. They just had a status quo analysis.

I guess in light of that and in light of the trip we took there last December to Japan, I was struck and still am by the lack of resources that we commit in the Department of Defense to monitoring what is occurring as far as technology development is concerned and getting that information back. My information right now is that we have six staff members who work exclusively on cooperative agreements with our NATO allies. We have one person who splits his time between Japan and Korea. That does not seem to me to be a commitment of resources on cooperative R&D activities that is adequate, in the case of the Far East.

I guess I am also anxious to know, you said something in the letter that you sent us, Mr. Yockey, about DARPA intending to open an office in Tokyo. I think that is a very good bit of news. I would be anxious to know the status of that. What timetable are you working against? I would be anxious to hear from any of you as to what more we can do to begin to react to the reality that this chart seems to portray, which is that the technology development activity that we need to focus on is occurring to a great extent in Japan and we do very little to keep track of it.

Mr. YOCKEY. First, within OSD, we have only one person that covers Japan versus the six people that cover Europe.

Senator BINGAMAN. Japan and Korea together; right? One person?

Mr. YOCKEY. Yes.

In OSD we are at staff level, and we act as the advocate down to the services who also have additional people that look at the areas. We are also in the middle of a reduction. We are trying to do some streamlining, and so we are trying to bring our total amount of people down by some number within the next few years to stay within the DMR requirement to reduce the DOD forces.

I might also point out that within the laboratories, within the services, and most certainly at DARPA, we have people that maintain a high degree of awareness of the issues as to where we stand in getting somebody from DARPA into the embassy. That is working. We have a lot of logistics to work out on that, including how to pay for it because of the budgetary pressures. We also see that as an issue that we would like to see brought to completion.

Fundamentally, I would also like to point out in this report by the Office of Technology Assessment there is also a chart that says basically the same thing, that both Congress and the DOD agree that they are ahead of us in certain niche areas, certainly the areas that are culled out like semiconductor materials, microelectronic circuits. That is a broad generic area, and they are not ahead in every element of that, only in certain significant parts.

Not that we are not concerned about that; we are, but I think perhaps Commerce has taken a different view. They are ahead commercially and in defense, whereas ours is specifically at defense.

There is one other thing that does not come out, unfortunately. As we tried to narrow the gap on these differences, we do have in addition to our normal contracts again out of DARPA and out of the laboratories, an awful lot that goes on within the defense industry itself in their R&D efforts. That is another sum of money that is being devoted toward catching up, if you will.

Specifically, in gallium arsenide, from my own past experience I know how much money we have put into our science centers and our microelectronics research centers in the company that I came from, and that goes across the board in a lot of companies. Additionally, of course, we have a number of very highly classified initiatives that, again, do not come out.

So there is more to the story than just a simple statement that Japan is ahead of us in this particular area. They are, and we are doing our best to get back to where our specific application can cover that and make sure that gap does not continue to exist.

On the broader aspect of that, of course, if we can do that, there should be some synergism that will flow back into other areas, and hopefully that will occur over time. So the best I can say is we are well aware of this, and we are trying to devote our resources to those specific issues where we feel that we have a gap, and we will try and close that gap as soon as we possibly can.

Senator BINGAMAN. Before Secretary Murrin responds let me just ask you to comment on one other thing. We asked the GAO to do a report of where foreign technology is being monitored in the Federal Government. And they came back with a list of 62 agencies and offices that have some responsibility or see that as part of

their job. There is nobody that has put that list together before, as far as we can tell. And some of them do a lot and some of them do very little.

I introduced a bill, S. 2349, to create an Office of International Technology Monitoring in the Technology Administration of Commerce, hoping that that might be a way to pull some of this together and make sense out of it, and better disseminate the information that was collected. I would be anxious to get your view on that, as well as on any of the rest that we have discussed.

Mr. MURRIN. Would you like me to comment, sir?

Senator BINGAMAN. Please.

Mr. MURRIN. Well, let me cover what I think are several relevant aspects of this which, taken together, are I think very positive reactions to your questions and to what you have been encouraging us to do for some time.

We now finally have on board at Commerce our new Under Secretary for Technology, Dr. Bob White. Bob gives every indication of being outstandingly able and aggressive. One of the first things we have arranged to do is to get Bob not only familiar with but cooperating closely with counterparts at DOD. For example, just a couple of days ago we talked with Dr. John Foster, who you know heads up the Defense Science Board, to, in that regard, get such a cooperative and hopefully a teaming effort underway.

I have been spending a good deal of time with Bob White, and one of his particular areas of interest relates quite exactly to this matter of international technology monitoring. It is a particular area of expertise of his. As I think you know, we have a small but frankly only limited effective operation at Commerce now, concentrating on Japan, and we are reexamining how that can be made much more effective. With the proposal you have suggested, I can assure you that we will put even more emphasis in this regard, and particularly try to do a much better job of coordinating these myriad agencies that the GAO report surfaced.

In turn, Allan Bromley and his efforts to rejuvenate the FCCSET, Federal Coordinating Council on Science, Engineering and Technology, I think holds a great deal of promise to address these issues. Several committees are being established, one new one is called Technology and Industry. Its mission is really central to these critical technologies and critical industries issues, and I am privileged to be the first chair of that group. I am teamed with my counterpart from NASA, J.R. Thompson, as vice chair, and a very key member of our committee will be Don Yockey's key technical colleague, Dr. Herzfeld, from the Department of Defense.

So what we hope is that we will have a much more formal and effective mechanism in the administration to think through analytically the matter of setting priorities for technologies, relating them to industrial base interests and competitiveness. And I do know, and I can assure you unequivocally that we will be using as a major guide in all of this these reports that you have referenced.

In this context, we do have consensus now in the administration, and I expect also on the Hill, regarding what is being termed the critical importance of pre-competitive enabling generic technologies. That escapes, hopefully, some of the contentious jargon that has burdened some of our deliberations of recent months and

years, and does provide an opportunity I think to allocate more of our priorities and resources in this direction.

Finally, let me mention one of Dr. Bromley's particular initiatives that I think is helping significantly also, and that is the formation of the President's Council of Advisors on Science and Technology. As you probably know, that is a group of about a dozen of the Nation's senior-most technocrats. It includes, for example, David Packard and Ralph Gomory and John McTague. And all three of those experts share very much the views that are found in the emerging technologies reports, and in many of the discussions that we and others have had with you and this distinguished committee.

And I make mention of it here because that group has direct access, as you probably know, to the President, and has on at least one occasion spent several hours discussing these very kinds of issues with the President. And he is very interested and very supportive that we proceed appropriately.

So I can assure you, Mr. Chairman and Senator Wallop, that this matter is considered to be very important, we are working much more closely and cooperatively throughout the agencies on this than perhaps was the case before, and, in turn, we are greatly heartened by the support and stimulation that we are getting from you and this distinguished committee, sir.

Senator BINGAMAN. Thank you. Senator Wallop.

Senator WALLOP. Thank you, Mr. Chairman.

Secretary Yockey, I was encouraged by your support of the development of cooperative programs, because it strikes me now that absent cooperative programs, none of us will be able to develop or build weapons, because their unit costs will exceed public tolerance in the West. And it seems to me that we cannot afford to have a European and an American F-18 duplicating each other at every level of production and research.

But, given the considerable uncertainties surrounding future NATO defense strategy, and in light of the changes, what are the prospects for meaningful arms cooperation with our European allies in the near future?

Mr. YOCKEY. That is an extremely difficult question to give you a precise answer. But let me just simply say this. We both know on both sides of the ocean that the requirements—or, I should not say the requirements, but the perceived threat, is somewhat diminished over the past. Therefore, the built-up demand to bring on new and ever-better weapon systems on a recurring basis has somewhat been slowed.

But, again, given that the threat is still considerable, I think the important thing is, from this point forward, as we do determine that the need exists and that they would be fully supported by both nations or all nations involved, once we can clearly establish that without any equivocation whatsoever, then I think we have a solid foundation to proceed on a cooperative basis, and see it carried out all the way through.

The biggest expenses that we have incurred in the past are where we have started and aborted for whatever reasons. So I think that if we start on a better footing, and I believe that footing can be established, and as I say again, the requirements are still

there, I think that we will find that we can bring these off in a much better fashion than we have in the past.

Senator WALLOP. I would genuinely hope so. Because I can see unit costs exceeding all credibility in any of our societies and in any of our politics.

Mr. YOCKEY. That is true, and of course, one of the problems, too, with cooperative efforts is that inherently those usually cost more because there are so many people involved in it, and that, of course, increases costs. But that is more than offset by the fact that more than one nation is sharing the cost of development.

Senator WALLOP. Well, it also depends on how you set up the cooperation.

Mr. YOCKEY. That is right.

Senator WALLOP. And if you can have preliminary agreements as to areas, which is politically difficult, I understand.

Mr. YOCKEY. It is. We hope to be able to do a better job in the future on it.

Senator WALLOP. Secretary Rowen, in your opinion, what will happen if the Congress rejects the forthcoming KFP agreement, assuming that it is forthcoming?

Mr. ROWEN. Well, there will be a lot of turmoil and chaos.

Senator WALLOP. Well, is the off-the-shelf purchase a realistic option?

Mr. ROWEN. The Koreans are very dedicated to the proposition that they want to be engaged in some production of this airplane. Their attitude is actually not very different from our own. I notice when we buy some weapon from abroad, and we occasionally do, we usually arrange to have production in the United States. When we bought the French tactical communication system, VEDA, from Thompson, we proceeded to make an arrangement to have it substantially manufactured in the United States. We do the same thing.

The Koreans are committed to this. The Japanese have been doing it for years. It costs more, but they are committed to it. Virtually all governments, except the very small countries where it is totally impractical, do this sort of thing. So it is a big commitment to them.

If the Congress were to turn this down, it would be a political—and I will use the word crisis—I mean, it would be a big problem if we turned it down. I do not quite know what the response would be.

Senator WALLOP. It is my understanding that there are four other nations, Canada, Spain, Australia and Kuwait, who have purchased the F–18 under co-production agreements that are similar to the Korean fighter programs. Is there anything new about the Korean fighter program agreement, in terms of technology to be transferred, that should give us pause?

Mr. ROWEN. Well, we have been very attentive to that technology transfer, as I mentioned in my remarks. We are monitoring it very carefully. We have negotiations that have been going on with the Koreans, that last round was completed on June 6, and we presented them with an MOU which they are now considering. They have to get back to us on it. It is very scrupulous in terms of its

treatment of the technology that will and will not be transferred in this project, with the concurrence of the Commerce Department.

So we are paying a great deal of attention to that.

Senator WALLOP. Given the Korean record in the past of noncompliance with third party transfer provisions in prior U.S. sales of defense equipment, are you confident that the controls that you have negotiated in the KFP agreement are strong enough to prevent the diversion of F-18 parts and technology?

Mr. ROWEN. You are right about some earlier practices with the Koreans. And this has made us, as a result, very attestative and very careful and very scrupulous about this particular agreement. We get a lot of help from the Commerce Department and the Congress, so that you can be sure that we are paying it an enormous amount of attention.

Yes, I think we can be quite confident.

Senator WALLOP. Then it is also apparent, I guess, that there have been some last minute snags, some new demands on the part of the Koreans that we substantially increase the amount of technology to be transferred. Two questions: Why do you think that they have made these demands so late in the process? And do you think that that will seriously jeopardize the MOU?

Mr. ROWEN. I cannot get into the details of ongoing negotiations.

Senator WALLOP. No, I am not asking that.

Mr. ROWEN. But I think it is a normal, hard bargaining negotiation.

Senator WALLOP. Thank you, Mr. Chairman.

Senator BINGAMAN. Secretary Mosbacher and Secretary Cheney weighed in to require the Korean government to limit the offsets to 30 percent; is that your testimony, Secretary Rowen?

Mr. ROWEN. Yes.

Senator BINGAMAN. How does that square with the general policy that we seem to not have in the area of offsets? As I understand our official position on offsets, we do not have a position. I compliment Secretary Cheney and Secretary Mosbacher for taking the initiative to insist on a reduction of these offsets to 30 percent from what it was previously intended to be, but how does that square with the general statements that we receive?

Mr. ROWEN. We bent our policy. It is clear. The general policy, of course, is stated correctly, which is to leave that to the companies involved. In this particular instance it seemed like there was a certain amount of whipsawing going on that got excessive between two competitors, and it did not look like a good scene, and it looked like one which it would be possible for us to do some good.

Offsets get very complicated and messy and very awkward to deal with, but in this case it seemed like an exception was in order. Secretary Cheney and Secretary Mosbacher took the position that it should be rolled back to 30 percent, and this was accepted by the Koreans. It is an exception basically.

Senator BINGAMAN. I urge more exceptions. Wherever possible, make an exception to your nonexistent policy.

Mr. ROWEN. No, to our existing policy.

Senator BINGAMAN. Let me ask Secretary Murrin, on the issue of these reciprocal procurement MOUs, should the Commerce Depart-

ment have a role in the negotiation and renegotiation of these reciprocal procurement MOUs, a more direct role?

As I understand it now, you have to work through the USTR. It seems to me there may be a need for a more direct role.

Mr. MURRIN. Mr. Chairman, let me say in general we are very pleased and encouraged at Commerce with the increased opportunities we have had in recent months largely due to your enlightened efforts in this committee to play a more significant role with DOD and USTR and others in this process. I think in my judgment, at least, it is going very well.

The person with whom I seek counsel at Commerce frequently on this matter is with us, John Richards. He is a real pro. May I ask John to comment because he is here?

Senator BINGAMAN. That is fine.

Mr. RICHARDS. Mr. Chairman, there are many different types of MOUs as you are aware, and different agencies have specific responsibilities for addressing factors in each. USTR does the reciprocal procurement MOUs. Department of Commerce does the individual specific MOUs. What we have done is to create an interagency environment, and we all work very well together. The Department of Commerce has its input into the reciprocal MOUs through the USTR, and I believe the understanding we have of Defense's position and that of Defense on our position will also be a part of the Defense input into the MOU negotiations.

They have accepted fully the understanding that economic and industrial issues are an important aspect of the MOUs, and I believe they are pushing those particular issues in the negotiations.

Senator BINGAMAN. Thank you.

Let me ask also about this decision which I understand has been made both by U.S. and British Governments that will not allow our companies to build a fiber optic communications system in the Soviet Union.

Are any of you prepared to explain the national security problem involved in going forward with that fiber optic system and whether or not this just opens it up to foreign competition to accomplish the same thing?

The little I know about it makes me wonder whether there is really a national security problem here or whether we just have not realized the change in world circumstance that would make it advisable for U.S. firms to be permitted to compete in this way.

Mr. YOCKEY. Sir, we would prefer to answer that question in a closed session. I do not think we can respond to it in open session.

Senator BINGAMAN. All right.

Mr. SULLIVAN. Mr. Yockey has given the right answer, that there is no way to really adequately explain in public session. All I can do is simply say that after careful deliberation and consultation with the British Government we have agreed to deny any licenses for this project to our companies and to enlist the support of any other countries that may have the potential to perform such an undertaking.

Senator BINGAMAN. So it is our policy that we are urging all of our allies to similarly prohibit their companies from doing this?

Mr. SULLIVAN. That is correct.

Senator BINGAMAN. Let me see if I have any questions or another subject here.

Did you have another question, Senator Wallop?

Senator WALLOP. I have just a couple of short questions.

Senator BINGAMAN. Go ahead.

Senator WALLOP. Secretary Yockey, one of the main ideas behind the NATO cooperative R&D program was that the United States and its allies should enter into these cooperative ventures on weapons incorporating so-called leading edge technology, but many of these cooperative programs have been criticized for being low-tech duplicates of certain U.S. special access programs because of restrictions on sharing highly sensitive U.S. technology with our allies.

Is this a fair criticism? If so, how do we solve it?

Mr. YOCKEY. I do not believe that it is a "fair" criticism. There certainly is some merit to the argument that some of the technologies that have been used in some of these programs do not fall in the ultra class flight arena. There are a number of programs that are under the cooperative effort that do deal with high technology. I might point out, though, that a lot of these are not in what you would categorize the 6.1/6.2 arena. Some of these are going into production so, therefore, it is in a sense yesterday's technology, but it is a technology that we are using appropriately in both places.

Obviously, the things that are so sensitive that we can share are not shared, so that is where I guess you would have to draw the line. The technology itself is not necessarily the driver. It is the application.

Senator WALLOP. But is there a friction between us and our allies as we develop these agreements?

Mr. YOCKEY. A friction?

Senator WALLOP. Yes.

Mr. YOCKEY. Not that I am aware of. It may be at the lower level, but it has not been brought to my attention.

Senator WALLOP. On these reciprocal procurement MOUs, both Secretary Murrin and you, Secretary Yockey, have indicated that the Departments of Defense and Commerce as well as USTR are exploring ways to strengthen the agreements. One of the complaints of the trading partners is the lack of a specified focal point within DOD for foreign companies who seek to bid on DOD contracts and who encounter obstacles bidding on a contract that is not directly related to the terms of the memorandum such as a delay in releasing technical information and technical data by the purchasing agency.

Is this also a problem for our companies trying to do business with the ministries of defense and our allies? If so, do both of us need do something? Is that part of what is going on in the three-agency, four-agency cooperating team?

Mr. YOCKEY. The answer is yes and no. It is a problem for some; for others it is not a problem. I would characterize it this way. The larger corporations who maintain a presence internationally, whether it be a European company that maintains a good presence here or a U.S. company that maintains a significant presence in Europe, are used to dealing in these matters and basically have a

marketing force, understand the system pretty well, and can deal with it.

There are idiosyncracies and differences, of course, on how you make announcements. We announce quite regularly down to a very low level. I believe it is $25,000 in the CBD. Everything that we are about to do is quite different than other countries. The smaller companies, the very small corporation, will obviously have some difficulties in being made aware of the opportunities that are there, but I do not know how to deal with that other than the fact that at those levels if they want to deal internationally they have to learn how to be internationalists, as it were.

Senator WALLOP. So in effect, it is a problem more of inexperience on the part of some corporations rather than a systematic problem on either our side or their side?

Mr. YOCKEY. That is my sense of it, yes, sir.

Senator WALLOP. Thank you, Mr. Chairman.

Senator BINGAMAN. Let me just ask one other question and make a comment here.

We have had a concern here in Congress for some time that the position of Deputy Under Secretary for Industrial and International Programs in DOD has remained unfilled now for about eight months. My information is that that person, that individual, has some important responsibilities. One of them is to serve as the U.S. co-chairman of the U.S.-Japan Systems and Technology Forum.

Do we have something going forward to fill that position?

Mr. YOCKEY. Yes, sir. We had hoped to make an announcement very, very shortly on filling that position. It has taken quite some time to find a very highly qualified person. I can assure you we do have a very competent staff. I am very, very proud of the capabilities that we have, and I have been spending quite a bit of time working with them. Hopefully, this will solve the problem.

Senator BINGAMAN. We appreciate that and look forward to that announcement.

The other point I would make is that I do think OSD is missing opportunities to pursue R&D cooperation with Japan. I think some of that is inevitably a result of the lack of staffing to accomplish that, but that something could be done to shift some people over as we cut back in other areas and find less of a need in other areas. I would hope we could fill those positions and get on with that.

Mr. YOCKEY. I understand your concern, sir, and we share those concerns. We will do everything we can to fill those positions.

Senator BINGAMAN. We appreciate that, and we appreciate the testimony of this panel.

At this point, we will dismiss this panel and go ahead to our second panel. You have been very patient with your time.

The second panel of witnesses consists of three experts on international defense trade and cooperation. In 1988 and 1989 Dr. Bobrow served as the Vice Chairman of this Defense Science Board Task Force on Defense Industrial Cooperation with Pacific Rim nations.

Dr. William Keller is the Director of a project at OTA entitled International Collaboration in Defense Technology. And our third witness, Mr. Robert Calaway, worked on defense trade and coopera-

tion in the Office of Secretary of Defense in the U.S. Mission at NATO.

Dr. Bobrow, please go right ahead.

**STATEMENT OF DAVIS B. BOBROW, VICE CHAIRMAN, DEFENSE SCIENCE BOARD TASK FORCE ON DEFENSE INDUSTRIAL COOPERATION WITH PACIFIC RIM NATIONS; DEAN, GRADUATE SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS, UNIVERSITY OF PITTSBURGH**

Dr. BOBROW. Thank you very much, Mr. Chairman and Senator Wallop.

On behalf of the members of the Defense Science Board Task Force and its chairman, Mal Currie, we all appreciate the opportunity to present some of the conclusions of the report and some of the recommendations.

I also will avail myself of your generous invitation to present some personal views. I would like to keep those two sets of remarks distinct.

DEFENSE SCIENCE BOARD RECOMMENDATIONS

Let me begin with the Defense Science Board report which, as you know, also included the participation of Tom Murrin before he assumed his present position. The report is a public document which I know is available to the subcommittee.

The spirit and many of the particular recommendations are very parallel and in great agreement with your trip report, Mr. Chairman, based on your visit to Japan a few months ago.

Given the limited time, I would prefer, rather than summarizing the conclusions, to concentrate on the recommendations. The conclusions are in my prepared statement which I have provided for the record.

Basically, the task force urged the Secretary of Defense to take a set of initiatives which would accomplish the following things:

They would help generate a presidentially supported national policy of two kinds. The first would place defense industrial cooperative programs in an integrated framework which gave very substantial weight to economic concerns as well as military concerns.

The second, which we treated as absolutely essential, was a creation of a national long-term technology vision, that would span both the defense and the commercial spheres. Without that vision, we felt the chances of re-invigorating our national technology and industrial base would be quite limited and inadequate.

Another set of recommendations addressed practices internal to the Department of Defense. These urged a set of changes which recognized that the era of defense industrial cooperation as primarily a matter of U.S. arms sales was long past and was not going to be regained. Defense industrial cooperation in the late 20th century will involve some arms sales, a lot of industrial cooperation and R&D cooperation, and that it will increasingly be with countries which are very vigorous economic competitors, as well as security cooperators.

These suggested changes include efforts to increase cooperation at more basic levels of science and technology, as distinct from

complete systems; to provide much greater staff expertise within the Defense Department and the Office of the Secretary on industrial and technological matters involving the Pacific; and to make a much more vigorous and focused use of a variety of defense industry and technology forums that already exist with Pacific nations.

Within the Department of Defense, we recommended a substantial reorganization, to place under a single manager all OSD activities centrally related to the subject of these hearings. That single manager would report to the Acquisition Executive, while the Under Secretary for Policy would retain jurisdiction for security assistance policy.

The single manager reporting to the Acquisition Executive would be responsible for the Defense Security Assistance Agency, the Defense Technology Security Agency, the current domains international of the Deputy Under Secretary of Defense for International Industrial Programs. The DSAA would be renamed the Defense Cooperative Programs Agency to reflect the mission emphasis we have recommended.

Outside of the Government, but with Government authorization, we urge much greater scope for industry-to-industry activity. We suggest a preference for commercial arrangements over Government MOUs, particularly when DOD appropriations are not involved.

We believe the Task Force put forward a middle ground which accommodates to technology and economic changes, as well as security interests. It avoids assuming either that the world is overwhelmingly friendly and cooperative, or that we can afford as a practical matter to go it alone.

## PERSONAL VIEWS

The personal views I now turn to very briefly, limiting myself to recommendations, follow from the year of experience since the task force completed its work. They are not necessarily shared by any of the other members of the task force.

First, the congressional actions, including the Office of Science and Technology Policy (OSTP) national critical technologies plan (for which leadership certainly should be claimed by the Senate) have done a great deal to stimulate momentum towards a national technology vision. It will take, in my opinion, continuing congressional initiatives to avoid that vision bogging down in endless interagency coordination. Further, I do not believe the technologies plan, *per se,* will be sufficient to generate the set of practical incentives from the various parts of the government that are needed across tax, R&D, procurement, education and trade policy.

Second, it is generally recognized that commercial competitiveness and the use of commercial technologies and components are going to be absolutely critical for the economically viability, quality and size of the future defense sector. I believe there is a contradiction between that understanding and looking to the Department of Defense, whose whole culture is rooted in criteria different from those of the civil market, to provide the key leadership for the development of commercially competitive technologies and manufac-

turing processes. DOD can help, but it surely does not have the values or experience that are central to that set of criteria.

Third, direct investment issues, both by foreign firms in the United States and by U.S. firms abroad, must be part of a national strategy for the defense matters of concern to these hearings. Globalization is with us; it can not be avoided in dual-use technology without extraordinary economic cost. In my prepared statement, I suggest a set of rules and approaches to deal with what should be our central fears, undue concentration and dependence on a single foreign supplier.

I believe those are avoidable. A rule is set forth which works against that concentration. In exchange for its vigorous pursuit, I also suggest we give much more consideration to proper participation by foreign firms in high technology U.S. programs. That participation should involve very firm guarantees about where the R&D and the initial production are performed—namely, inside the United States.

We clearly need to move beyond the point of thinking nationality is a function of the headquarters home of a company, as distinct from where its various activities are conducted.

Fourth, I do suggest that we will also have to move beyond reliance on bilateral dealing between two governments on the topics of concern to these hearings. To a large extent, defense industry and technology has been kept outside of the GATT (General Agreement on Tariffs and Trade) and other multilateral arrangements. Dual-use technology companies heavily into commercial as well as military production all imply that that is decreasingly realistic. And so we will need, I think, to proceed, to look at instruments like a revised GATT to provide a reasonable degree of competitive order in defense-relevant industry and product trade, as we have looked to it in other areas of trade and industry.

All of this implies to me that the United States will have to either develop new institutions or very different mandates for current institutions, other than the Department of Defense. Most foreign governments, including those we find very vigorous in their pursuit of advanced technology, such as the Japanese, have recognized that dual-use technologies central to international competitiveness and economic growth should not be left to defense ministries or to military institutions.

Perhaps we need to think about that more seriously ourselves. Surely, most of the foreigners we will have to deal with on a government-to-government level, and the real centers of influence in those foreign governments, will increasingly be economic ministries and science and technology agencies rather than armaments directors and defense ministries.

I also think facing up to the world we seem to find ourselves well into involves recognizing that the industry-to-industry, the firm-to-firm, level is really the key to mutually beneficial joint action that translates into manufacturing excellence and technology leadership. We need to find ways of creating a policy framework that unleashes industry for cooperative arrangements in dual-use areas.

If we do not evolve that policy framework, I think we can expect either one of two things. The last year has already manifested those with regard to Japan. One is more FSX affairs, which are

probably in no one's particular interest. The second is a climate of inhibition——

Senator WALLOP. Did you say in no one's particular interest?

Dr. BOBROW. To go through the set of controversies, lengthy, public——

Senator WALLOP. I am sorry, I thought you meant the agreement itself.

Dr. BOBROW. I am not speaking to the agreement itself. I am speaking to the process and the whole set of events that characterized it. Thank you for the clarification.

The alternative, without a new policy framework, will be a climate of inhibition that precludes enhanced cooperation in defense industrial and technological matters. I believe we are witnessing that inhibition at the industry-to-industry level now, with regard to Japan. It is understandable; I do not think it is in our interest.

The outcome of inhibition can only worsen our national position in defense-related trade. It will further erode security relations with our industrial allies. That will be particularly unfortunate as we move into an historical period where the security relationship will have to rest more on industrial and technological cooperation and less on the overseas presence of U.S. forces.

Thank you very much for your consideration.

[The prepared statement of Dr. Bobrow follows:]

Statement of

Davis B. Bobrow

Dean

Graduate School of Public and International Affairs

University of Pittsburgh

Mr. Chairman, Senator Wallop and Members of the Subcommittee:

I appreciate the opportunity to present to this subcommittee views from two perspectives concerning international trade and technology and industrial cooperation relevant to our national defense. The first perspective is that of the Defense Science Board Task Force on Defense Industrial Cooperation with Pacific Rim Nations in its report of October, 1989 (Office of the Under Secretary of Defense for Acquisition). The second is a purely personal one based on almost two decades of consultancy to the Office of the Secretary of Defense and several periods of extended research in Japan, the most recent of which concluded in March of this year.

Defense Science Board Views

The Task Force was chaired by Dr. Malcolm R. Currie, Chairman and CEO of Hughes Aircraft, and its membership included Mr. Tom Murrin, now Deputy Secretary of Commerce. I served as Vice Chairman. As ably summarized by Dr. Currie, the Task Force concludes that:

--"By the year 2000, the Pacific Rim (led by Japan, but with others following on its heels) will be an even more dominant center of world economic power and will become a world-class technological leader in aerospace (including much defense technology), electronics, telecommunications, basic components and advanced materials.

--"Technology (including the processes and management of manufacturing) has become a new measure for the power of nations and most advanced technologies are dual-use in nature (i.e., applicable to both defense and commercial products).

--"National security can no longer be viewed only in military

terms, but must include economic well-being as a key component. History is unkind to nations that lose control of their economic destiny. Therefore, we must explicitly link cooperative defense technology-sharing issues with economic issues, including trade balance and market access. This ...recognizes the new trends and realities as appreciated by all other nations....We currently lack ...a high-level institutional structure to make and implement coherent policy on technical and trade issues that affect both defense and economic competitiveness. Such a policy must evolve from an inter-agency process ... embracing both economic and security objectives ...[to]...replace the disarray and fragmentation that is now the case.

--"Our comparative industrial, manufacturing and technological strength has eroded seriously during the last decade. This erosion must be reversed so that we can then enter cooperative ventures involving technology transfer from a position of strength. To accomplish this, we must establish an explicit long range national technology vision from which can flow the initiatives...fundamental to realizing this essential goal.

--"A simple extrapolation of past "NATO style" defense industrial cooperation is not appropriate for the Pacific Rim. It should be replaced by a revised policy of rigorous pragmatism based on mutual benefits. We must insist on a rigorous rationale in terms of explicitly thought-out long term military and economic justification (including the U.S. industrial and technology base); we must clearly articulate the mutual benefits beyond short-term financial considerations....With Japan, and others as time goes on, this will require a clearly understood and articulated, mutually beneficial, two-way sharing of technology and other benefits. Defense industrial cooperation...still can form a strong link with our allies and maintain U.S. influence in defense matters, particularly as our physical presence may diminish with time."

The Task Force finds the current organization of the Department of Defense and inter-agency processes involving it, the Departments of State and Commerce, and the U.S. Trade

Representative to be "cumbersome and outmoded." It finds seriously inadequate Department of Defense staffing to deal on relevant matters with the nations of the Pacific in an era where "military assistance and sales" have been replaced by the imperatives of security cooperation in industrial and technological matters with those who are our economic competitors in civil markets.

Finally, the Task Force concludes that improved partnership with the Congress is essential for policies that can be sustained and secure foreign confidence. That cooperation is essential in matters conducted on a government-to-government basis. It is equally important to increase industry-to-industry cooperation within a framework that guards the national interest.

Accordingly, the Task Force force recommends Secretary of Defense actions that will lead to:

-- Presidentially supported guidance of two kinds. The first should place defense industrial cooperative programs within an integrated national economic, political and military framework for setting objectives and assessing impacts and trade-offs. The second should take the form of a national long-term technology vision that will catalyze U. S. public and private sector actions to rebuild and maintain our technological leadership and industrial competitiveness , both in defense and in commercial spheres.

-- Practices internal to the Department of Defense to assess the "mutual benefits" of particular cooperative ventures (including technology exchange and production work-shares), to increase international cooperation at basic levels of science and technology, to provide greater staff expertise on industrial and technological matters pertinent to Pacific nations, and to make greater use of bi-lateral and multi-lateral defense industry and technology forums with Pacific nations.

-- An internal reorganization of the Department of Defense to place under a single manager responsible to the acquisition executive OSD international trade activities, the Defense Security Assistance Agency (DSAA), the Defense Technology Security agency (DTSA), and the Deputy Under Secretary of Defense for International

and Industrial Programs (DUSD (I&IP)). An initial task of the single manager should be to streamline the approval process for cooperative programs to lessen disincentives for industry to participate. Control of security assistance policy should remain with the Under Secretary of Defense for Policy. DSAA should be renamed the Defense Cooperative Programs Agency to reflect the mission emphasis the Task Force recommends.

-- Greater private sector activity in establishing cooperative projects. "DoD should consult with industry regarding negotiation with foreign governments of program-specific Memorandums of Understanding (MOUs)...[For]...co-production, DoD should give preference to the use of commercial arrangements in lieu of governmental MOUs. Even in the area of international co-development, there is a role for industry-to-industry arrangements to the exclusion of governmental MOUs when DoD appropriations are not involved."

In sum, the Task Force recommends a reasonable middle ground between unilateral protectionism and turning a blind eye toward civil economic competition, technological strength, and national aspirations in the Pacific. In general tone, and in many specific recommendations, the Task Force would agree with the views expressed by Senator Bingaman following on his December, 1989 trip to Japan.

Personal Views

Having summarized the Task Force conclusions and recommendations, I will now turn to personal views. These reflect and have been reinforced by international and domestic developments since the Task Force finished its work.

The momentum and direction of international developments have substantial implications for the subject of these hearings.

First, change in the architecture of European security and the economic integration of the European Economic Community are undercutting established modes of defense industrial and technological cooperation with our European allies.

Second, on a global basis, there is little doubt that the U.S.

foreign military presence under-girding security cooperation will lessen. The direction of change is clear even if the rate is uncertain. Continuing security cooperation will have to rest increasingly on industrial and technology relationships

Third, among our advanced industrialized allies, very much including those in Asia, there is an increasing emphasis on a security posture less dependent on the U.S., on a pro-active policy of normalization toward the Soviet Union, and on ways to decrease the financial burdens defense industries impose on the national economy and central government budget. Policy adjustment on our part is thus necessary rather than optional. We will have to find a way to live with others who will increasingly reject primary let alone exclusive defense product and technology dependence on the U.S. We will have to adapt to vastly increased technology transfer to the Soviet Union and Soviet efforts to export defense products. We will have to compete in a world where foreign defense relevant industries will pursue domestic and export markets with increased intensity, where they will receive governmental support for doing so, and where they will apply dual-use technologies to civil as well as military end-items.

Fourth, economic growth based on prowess in dual-use technologies is an increasing preoccupation of most nations as is domestic and international market share in products based on those technologies. For America, this means increasing competition in defense relevant R&D and production, a dauntingly high bill in the absence of commercial competitiveness, and the prospect that others will have attractive dual-use technology to offer to us. It is only realistic to expect that relevant national policies will fall only in modest measure within the traditional domains of defense ministries and military industries. Broader economic considerations and the ministries and interest groups they involve will be crucial. The issues are not just ones of defense, but at least as much ones of national technology base, international competitiveness in high value added sub-sectors, and employment. The crucial foreign and U.S. parties will no longer be limited to

those traditionally associated with defense, and our policy process must be modified accordingly.

Fifth, industries based on advanced dual use technologies are increasingly globalized. The particulars include production sites (including components and subassemblies) in many countries, foreign direct investment in and joint ventures with relevant firms in many countries, and R&D in countries other than the home of the firm's headquarters. American policies will then be significantly incomplete unless they address foreign investment issues (incoming and outgoing). They will rest on illusion unless they pay substantial attention to the geography of production and development of components, sub-assemblies, and manufacturing apparatus -- and not just to the nationality of the firm whose name appears on prime contracts and finished products.

In short, while peace may not have broken out, the Cold War security order has broken down. So has its economic order with respect to the U.S. as the dominant possessor of advanced technology and investment capital. We cannot clearly foresee the nature of the emerging security and economic order. Yet we surely can tell already that an attempt at defense industrial and technological autarchy carries with it the most substantial security and economic costs, with little prospect of our being able and willing to sustain those costs.

Domestically, it is no longer realistic to look to the Department of Defense and the leadership of the defense industry for primary leadership in the industrial, technological and manufacturing initiatives for a new security and economic environment. While the Task Force clearly recognized that the subject of these hearings goes well beyond the competence and jurisdiction of the Department of Defense and the primarily defense firms of our private sector, it did hope for leadership from those quarters. That seems to be to have been too optimistic. U.S. defense officials will simply be too preoccupied with extraordinary issues in their most central areas of responsibility bearing on core matters of budgets, strategy, force structure and political-

military rationale. Executives of firms heavily dependent on the defense sector will be laboring with grave matters of down-sizing, difficulties in securing capital, and indeed of industrial conversion. These understandable pre-occupations severely inhibit the chances of their giving priority to the issues of concern to the DSB Task Force and to this subcommittee. At the same time, the international changes work to change the distribution of influence within the U.S. Government and the private sector.

The leadership of a vigorous and coherent U.S. government policy on defense relevant dual-use industry, technology and trade will have to be provided by institutions other than the Department of Defense, and the defense industry. Nor has any other cabinet department yet demonstrated the vision and capacity to develop and conduct policies of the scope and complexity that seem to be needed. As a result the current situation discourages American and foreign industry, and American and foreign government officials, with respect to arrangements that offer mutual economic and security benefits at a tolerable level of political friction and risk.

While a full statement of sound national policy may be premature, some of its major elements are reasonably clear. They go well beyond courses of action that the current Administration seems willing or able to embrace and act on.

First, the momentum for a national technology vision to be developed by OSTP must be bolstered by continuing Congressional action, lest it be dissipated by the tedious processes of inter-agency coordination. The Congressionally mandated OSTP National Critical Technologies Plan is a useful step but will not be sufficient to generate a set of practical incentives from the various parts of the U.S. government across tax, R&D, procurement, education, and trade policy.

Second, the sine qua non of commercial competitiveness internationally will not be achieved so long as primary instruments of government action are parts of the Department of Defense whose whole culture is rooted in criteria different from

those of the civil market. Different locomotives and architects of investment must be found.

Third, issues of direct investment by foreign firms in the U.S. and by U.S. firms abroad must be part of a national strategy for defense related trade and industrial and technological cooperation. Globalization cannot be avoided in an era of dual use technology without very severe costs. Here the real danger is excessive concentration of production and R&D in a few foreign hands. A set of suggestions put forward by Theodore Moran of Georgetown University merits the most serious consideration.

Central to these is a 4/4/50 rule -- prevent situations where four or fewer firms of four or fewer foreign countries have 50% or more of the market for a relevant product or by extension cutting edge technology. Note that this is a general rule, not one focused on the Japanese. The U.S. should block foreign direct investment that violates that rule. Otherwise it should permit friendly acquisitions while stipulating that R&D and production be conducted in the U.S. for an initial period of years. Subsequent relocation would be permissible if compatible with the 4/4/50 rule.

Firms from allied countries should be allowed full participation in all U.S. high technology programs so long as the rule is observed, and an appropriate security of information agreement concluded. At the same time, we should require that R&D funded by the U.S. Government be conducted in the U.S., and that subsequent production be in the U.S. or a third country.

The rule should be defended through a focused "national security tariff," not through blanket sector or sub-sector protection. Those blanket measures will only deprive us of useful technology and products, and weaken incentives for U.S. firms to attain and maintain competitiveness. If economics and technology have already bypassed the rule, we should proceed to negotiate a multilateral convention to block possible political or economic extortion.

Fourth, more generally we need to forge a set of international conventions for defense relevant dual-use technology industries and

products rather than leaving them to bilateral dealing. The future world defense economy cries out for the sort of frameworks that we are trying to forge through a revised GATT for other economic activities.

In sum, we need to come to policy terms with the new world of defense related manufacturing and technological interdependence and diffused technology excellence. Doing so will require either new U.S. institutions, or vastly different mandates for current institutions other than the Department of Defense. Clemenceau observed in the context of World War I that war was too important a matter to be left to the generals. Many foreign governments have recognized that a similar principle operates for dual-use technologies central to international competitiveness and economic growth, and not just to defense. It is past time for us to do so as well.

In government-to-government arenas, this means shifting our relationships away from concentration on armaments directors and defense ministries toward economic ministries and science and technology agencies. It also means recognizing that firms (industry-to-industry) are the key agents for mutually beneficial joint action, not governments. Failure to make these institutional changes guarantees either more FSX affairs, or a climate of inhibition that precludes enhanced cooperation in defense industrial and technological matters. Such an outcome can only worsen our national position in defense related trade, and further erode security relations with our industrialized allies.

Senator BINGAMAN. Thank you very much. Dr. Keller.

## STATEMENT OF WILLIAM W. KELLER, PROJECT DIRECTOR, INTERNATIONAL SECURITY AND COMMERCE PROGRAM, OFFICE OF TECHNOLOGY ASSESSMENT

Dr. KELLER. Thank you, Mr. Chairman, for the opportunity to testify before the subcommittee today. My name is Bill Keller. I am a senior analyst in OTA's International Security and Commerce Program. I am directing the assessment that you and Senator Wallop requested on international collaboration in defense technology.

In this statement I will summarize briefly some of the major findings in our first report, Arming Our Allies: Cooperation and Competition in Defense Technology, which was released in May. In the interests of keeping my comments as short as possible, I re-

quest that my prepared statement and the overview of the report be inserted into the record.

[A copy of the aforementioned OTA report will be retained in the committee files.]

As you are aware, Mr. Chairman, this report was prepared during a period of unprecedented and dramatic change in international relations. We have seen the collapse of communism in Eastern Europe, the rise of internal political and nationalist struggles in the Soviet Union, and the onset of a new era in U.S.-Soviet relations.

OTA has taken account of these changes in our report on international armaments collaboration. However, most of our analysis concentrates on several significant trends that were already exerting pressure on the structure of military cooperation in the West.

These trends include: increasing parity in the development and production of advanced weapons systems throughout Western Europe and in the Western Pacific; overcapacity in many sectors of the global defense industries; economic integration of Western Europe; fourth, consolidation and contraction of the defense industries, both here and in Europe; and globalization of the defense industrial base. At the same time, we see a precipitous decline in defense budgets.

These factors are creating significant adjustment in the U.S. defense industries and in the structure of international collaboration, adjustments that will no doubt be accelerated by events in Eastern Europe. With this background in mind, I would like to briefly summarize the findings of the OTA report.

The United States has transferred military technology and equipment to its allies in time of war and throughout most of the post-World War II period. This collaboration has taken many forms, including lend-lease, foreign military sales, teaming, joint ventures, corporate alliances and others. The principal reason the U.S. transferred military technology to its allies, both in Europe and in Asia, was to build up their defense industries, their economic bases, and their military capacity for mutual defense against the threat of aggression by the Soviet Union and other communist powers.

The policy of arming our allies and transferring defense technology to them has been remarkably successful. In the space of a few decades it made possible the development of multiple centers of sophisticated defense technology and industry across Western Europe and in the Western Pacific.

Although the United States still leads the world in developing next generation weapons systems, the U.K., France, Italy, West Germany, Japan, South Korea and others are now capable of producing defense technology in some fields that is as good as ours and may even be better. Consequently, competition among the different national and regional defense industries has become intense.

The United States has yet to come to grips with the down side of the success of our policy on collaboration in defense technology. Stated bluntly, we have helped our allies build up their defense industries and commercial capability to the point where they have become our competitors. Accordingly, U.S. policies on armaments cooperation will have to be reconsidered if they are to reflect today's economic, political and technological realities.

It became clear in the course of the FSX debate, for example, that the U.S. Government lacks a coordinated policy by which to address specific cases like the FSX or to resolve general questions arising from armaments collaboration with its allies. This Committee has, of course, taken active steps to improve U.S. policy on arms collaboration by establishing a framework for the FSX accord in 1988 and by requiring the Secretaries of Defense and Commerce to coordinate in negotiation of memoranda of understanding with our allies.

But in the absence of a comprehensive policy we believe that the controversy over the FSX will be revisited the next time DOD negotiates a major co-development program with Japan or possibly with other allies. Security and trade issues in the Japanese context, which had long been separate, have collided and will now have to be considered within a single policy framework.

The argument that the United States should transfer technology to increase Japan's military capability and to strengthen ties between the two nations has lost much of its force. Trade and security issues will be more tightly coupled in the future, and continued success of the U.S.-Japan security relationship, a very, very vital relationship, will be coupled increasingly to our ability to reduce trade frictions between the two nations and resolve outstanding trade disputes.

In the European context, elements of national rivalry still exist among the major defense equipment-producing nations. At the same time, there is a strong trend toward governmentally-sponsored intra-European defense industry cooperation, which is centered on the reactivated IEPG, Independent European Program Group.

European defense industry also benefits from a variety of government-supported cooperative research programs in civilian dual-use technologies. EC 1992, about which we have heard a lot today, while ostensibly excluding defense trade, will probably have a strong impact on the defense area, if for no other reason than that the major defense companies are also heavily involved in civilian sector activities. That is true in the Japanese context, of course, as well.

It is likely that competition between the U.S. and European defense companies will escalate as both groups seek to export sophisticated weaponry to Third World countries to maintain revenues and keep production facilities open in a declining global market. Differences in the political and economic interests of the United States and its European NATO allies will become increasingly important.

It is possible, for example, that the United States will need to project power into regions where belligerents have been armed with weapons produced by various European nations and perhaps by the U.S. as well. This problem was demonstrated in the Persian Gulf when the U.S.S. *Stark* was struck by two French-made Exocet missiles.

In that case and cases like that, the United States will have to design its weapons systems to counter not only Soviet weapons but many others as well, and the question of what U.S. defense technology is transferred to Europe will become crucial. As you know,

many advanced European weapons systems have incorporated technologies initially developed or co-developed by U.S. defense companies.

The success of U.S. policy toward its allies has spawned a number of unintended consequences. U.S. superiority in military technology among non-communist powers is declining. The United States has lost its post-World War II monopoly advantage in the development and production of advanced weapons systems.

We can no longer expect most of our European allies and Japan or Korea to buy major weapons systems that were originally designed and developed in the United States. Allies increasingly insist that collaboration take the form of cooperative development to enhance their domestic technology bases.

The loss of technological supremacy may be an unavoidable long-term cost of maintaining strong security alliances. Maintaining those alliances might also be the price of gaining access to superior foreign defense technology and dual-use technology in the future.

Corporate collaboration in defense technology is accelerating this process, and undermining the DOD national security posture of designing and fielding defense systems at least a generation ahead of the competition. However, the changing nature of the military threat makes this an appropriate time to reevaluate our basic national security strategies and goals.

Over time, U.S. policy has also contributed to significant peacetime overcapacity in the defense industries worldwide and to intense international competition for sales of high technology weaponry. World events have combined to reduce demand for defense material at a time when the defense industries have achieved overcapacity of supply.

Major U.S. defense producers expect worldwide military funding to decrease over the next several years and then to stabilize at much lower levels. This decrease will cause intense competition, contraction, and restructuring in the United States and other armaments industries. We know that large U.S. companies are already rationalizing their operations, laying off workers, seeking new markets, and forming strategic international alliances to weather the storm.

Competition, however, is only part of the story. International corporate cooperation in the development and production of defense systems is escalating. The large U.S. defense contractors are becoming increasingly multinational in their operations. Collaboration between U.S. and foreign firms takes many forms, including co-production, co-development, teaming, subcontracting and even foreign direct investment.

But not all sectors of the defense industries benefit equally from international business. Large prime contractor companies that build and integrate whole systems generally see increased internationalization as a positive business trend. They argue that international corporate alliances create access to new foreign markets and the best technology, and will ultimately produce greater efficiencies by driving less competitive suppliers out of business. Some of the less competitive suppliers do not like that.

Smaller subcontracting companies that depend on DOD and the primes for much of their business worry about losing sales to for-

eign competition. They often view foreign participation as a zero sum game, a lost opportunity for a U.S. company that may be extremely damaging to that company's future. They argue, moreover, that increased international collaboration may ultimately create unacceptable dependence on foreign firms and erode critical parts of the U.S. defense industrial base.

As defense companies restructure their operations in response to overcapacity and declining defense budgets, there will be a few winners and many, many losers. It is possible that the United States could end up with a defense industrial structure inadequate to the defense of the nation. It is also possible that the United States will not need anything approaching the level of defense industrial capacity that it has built up over the past three decades. The challenge will be to convert the defense industries to an appropriate peacetime posture and still retain the capacity to mobilize in a crisis.

In this testimony, Mr. Chairman, I have tried to summarize the findings of OTA's assessment to date. We still have a year to go. As you know, we will be delivering our report on critical technologies to you in the early fall, and then we will be giving you a final report on the project in about a year.

Thank you very much.

[The prepared statement of Dr. Keller follows:]

STATEMENT OF WILLIAM W. KELLER

Project Director

International Security and Commerce Program

Office of Technology Assessment

Mr. Chairman, thank you for the opportunity to testify before this subcommittee. My name William W. Keller. I am a senior analyst in OTA's International Security and Commerce program. I am directing the assessment you requested on "International Collaboration in Defense Technology."

In this statement, I will summarize briefly some of the major findings in our first report, Arming Our Allies: Cooperation and Competition in Defense Technology, which was released in May. In the interests of keeping my comments as short as possible, I request that my prepared statement and the overview of the OTA report be inserted into the record.

As you are aware Mr. Chairman, this report was prepared during a period of unprecedented and dramatic change in international relations. We have seen the collapse of communism in Eastern Europe, the rise of internal political and nationalist struggles in the Soviet Union, and the onset of a new era in U.S.-Soviet relations. OTA has taken account of these changes in our report on international armaments collaboration. However, most of our analysis concentrates on several significant trends that were already exerting pressure on the structure of military cooperation in the West. These include:

- increasing parity in the development and production of advanced weapons systems throughout Western Europe and the Western Pacific;
- overcapacity in many sectors of global defense industries;
- economic integration of Western Europe pursuant to the Single Europe Act (EC92);
- consolidation and contraction of the defense industries, both in Europe and in the U.S.;
- globalization of the defense industrial base; and
- decline in defense budgets.

These factors are creating significant adjustment in the U.S. defense industries and in the structure of international collaboration;

adjustments that will no doubt be accelerated by events in Eastern Europe. With this background in mind, I will now summarize the findings of the OTA report.

Summary of Findings

The U.S. has transferred military technology and equipment to its allies in time of war and throughout most of the post WWII period. This collaboration has taken many forms including lend-lease, foreign military sales (FMS), teaming, joint ventures, and corporate alliances. The principal reason the U.S. transferred military technology to its allies, both in Europe and in Asia, was to build up their defense industries, economic base, and military capacity for mutual defense against the threat of aggression by the Soviet Union and other communist powers.

The policy of arming our allies and transferring defense technology to them has been remarkably successful. In the space of a few decades it made possible the development of multiple centers of sophisticated defense technology and industry across Western Europe and in the Western Pacific. Although the U.S. still leads the world in developing next generation weapons systems, the U.K., France, West Germany, Italy, Japan, South Korea and others are now capable of producing defense technology in some fields that is competitive with or better than that produced in the U.S. Consequently, competition among the different national and regional defense industries has become intense.

The U.S. has yet to come to grips with the downside of the success of our policy on collaboration in defense technology. Stated bluntly, we have helped our allies build up their defense industries and commercial capability to the point where they have become our competitors. Accordingly, U.S. policies on armaments cooperation will have to be reconsidered--if they are to reflect today's economic, technological, and political realities. It became clear in the course of the FSX debate, for example, that U.S. government lacks a coordinated policy by which to address specific cases like the FSX, or to

resolve general questions arising from armaments collaboration with its allies. This committee has, of course, taken active steps to improve U.S. policy on arms collaboration by establishing a framework for the FSX accord in 1988 and by requiring the Secretary of Defense to consult with the Secretary of Commerce in the negotiation of memoranda of understanding (MOUs) with our allies.

But in the absence of a comprehensive policy, the controversy over the FSX will be revisited the next time DoD negotiates a major codevelopment project with Japan. Security and trade issues, which had long been separate, have collided, and will now have to be considered within a single policy framework. The argument that the United States should transfer technology to increase Japan's military capability and to strengthen ties between the two nations has lost its force. Trade and security issues will be more tightly coupled in the future, and continued success of the U.S.-Japan security relationship will depend increasingly on the ability of the two nations to reduce economic confrontation and resolve outstanding trade disputes.

In Europe, elements of national rivalry still exist among major defense equipment producing nations. At the same time, there is a strong trend toward governmentally sponsored intra-European defense industry cooperation, centered on the re-activated Independent European Programme Group (IEPG). European defense industry also benefits from a variety of government supported cooperative research programs in civilian dual-use technologies. EC 1992, while ostensibly excluding defense trade, could have a strong impact in the defense area because most major European defense producers have important civilian sector interests.

It is likely that competition between U.S. and European defense companies will escalate as both groups seek to export sophisticated weaponry to the Third World to maintain revenues and keep production facilities open in a declining global market. Differences in the political and economic interests of the United States and its European NATO Allies will become increasingly important.

It is possible, for example, that the United States will need to project power into regions where belligerents have been armed with weapons produced by various European nations and perhaps by the U.S. as well. (This problem was demonstrated in the Persian Gulf when the U.S.S. Stark was struck by two French-made Exocet missiles.) In that case, the United States would have to design its weapons systems to counter not only Soviet weapons but many others as well, and the question of what U.S. defense technology is transferred to Europe will become crucial. Many advanced European weapons systems have incorporated technologies initially developed or codeveloped by U.S. defense companies.

The success of U.S. policy toward its allies has spawned a number of unintended consequences. U.S. superiority in military technology among non-communist powers is declining. The United States has lost its post WWII monopoly advantage in the development and production of advanced weapons systems. We can no longer expect most of our European allies and Japan to buy or even co-produce major weapons systems that were originally designed and developed in the United States. Allies increasingly insist that collaboration take the form of cooperative development to enhance their domestic technology bases.

The loss of technological supremacy may be an unavoidable long-term cost of maintaining strong security alliances. Maintaining those alliances might also be the price of gaining access to superior foreign defense technology in the future. Corporate collaboration in defense technology is accelerating this process, and undermining the DoD national security posture of designing and fielding defense systems at least a generation ahead of the competition. The changing nature of the military threat makes this an appropriate time to re-evaluate our basic national security strategies and goals.

Over time, U.S. policy has also contributed to significant peacetime overcapacity in the defense industries, worldwide, and to intense international competition for sales of high-technology weapons. This can be stated generally in economic terms as follows: World events have combined to

reduce demand for defense material at a time when the defense industries have achieved overcapacity of supply. Major U.S. defense producers expect worldwide military funding to decrease over the next several years, and then to stabilize at much lower levels. This will cause intense competition, contraction, and restructuring in the U.S. and other armaments industries. Large U.S. companies are already rationalizing operations, laying off workers, seeking new markets, and forming strategic international alliances to weather the storm.

Competition is only part of the story. International corporate cooperation in the development and production of defense systems is escalating. The large U.S. defense contractors are becoming increasingly multinational in their operations. Collaboration between U.S. and foreign firms takes many forms including coproduction, codevelopment, teaming, subcontracting, strategic alliances, joint ventures, and even foreign direct investment. It can be quite lucrative. Some U.S. companies have told OTA that while international sales account for only about 15 percent of their business, it amounts to more than 25 percent of their profits. In general, the defense industries are not yet globalized in the way that civilian industry is--because large U.S. defense companies still conduct most of their R&D and production in the U.S. But the trend toward internationalization is well-established.

Not all sectors of the defense industries benefit equally from international business. Large prime contractor companies that build and integrate whole systems generally see increased internationalization as a positive business trend. They argue that international corporate alliances create access to new foreign markets and the best technology, and will ultimately produce greater efficiencies by driving less competitive suppliers out of business.

Smaller subcontracting companies, that depend on DoD and the primes for much of their business, worry about losing sales to foreign competition. They often view foreign participation as a zero sum game, a lost opportunity for a

U.S. company that may be extremely damaging to that company's future. They argue, moreover, that increased international collaboration may ultimately create unacceptable dependence on foreign firms and erode critical parts of the U.S. defense industrial base.

Concurrently, international collaboration among defense companies appears to be growing at a time when transatlantic inter-governmental cooperation in defense technology has become increasingly problematic. In Europe, maintaining cohesion within the NATO Alliance has always been a balancing act, even in the face of a common threat from the East. Achieving rationalization, standardization, and interoperability (RSI) of Allied weapons has proved to be an elusive goal. Armaments cooperation among the NATO Allies should have political benefits as well, but as the Nunn amendment programs have demonstrated, involving many governments in co-development lowers the odds of a successful outcome.

Although they constitute the principal means for DoD to encourage codevelopment with the European Allies, the Nunn amendment programs have encountered many difficulties and stumbling blocks. Several key programs have been discontinued, and in others, one or more of the Allies has pulled out. While each failed attempt is a separate story, harmonizing military requirements among several nations with different geographical and strategic concerns appears to be extremely difficult. Increased bureaucracy and regulation has also raised impediments.

As defense companies restructure their operations in response to overcapacity and declining defense budgets, there will be a few winners and many losers. It is possible that the United States could end up with a defense industrial structure inadequate for the defense of the nation. It is also possible that the United States will not need anything approaching the level of defense industrial capacity that it has built up over the past three decades. The challenge will be to convert the defense industries to an appropriate peacetime posture and still retain the capacity to mobilize in a crisis.

In this testimony, Mr. Chairman, I have tried to summarize the findings to date of OTA's assessment on cooperation and competition in defense technology. We still have a year to go in our research and reporting. As you know, we will be delivering our report on "critical technologies" in the early fall. We also expect that our final report will be delivered to Congress next spring. That report will provide an overall assessment of the defense industries in Europe and in East Asia, and will contain policy options for improving our U.S. defense industrial structures and policies based in part on some of the practices we have observed abroad.

THANK YOU.

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# ARMING OUR ALLIES:
## Cooperation and Competition in Defense Technology

OFFICE OF TECHNOLOGY ASSESSMENT
CONGRESS OF THE UNITED STATES
May 1990

# Overview and Principal Findings

The established order of the Cold War period is being rapidly supplanted by new security and economic relations. There is much uncertainty regarding the future of NATO and the Warsaw Treaty Organization, the evolving political systems of Eastern Europe, internal political and nationalist struggles in the Soviet Union, German reunification, economic integration of Western Europe, and future superpower relations. What is certain is that **the reasons the United States collaborated with its allies in defense technology are not as valid as they once were, and U.S. policies on armaments cooperation, broadly conceived, must be reconsidered.**

The principal reason the United States transferred military technology to its allies, both in Europe and in Asia, was to build up their defense industries and military capacity for mutual defense against the Soviet Union and other communist powers. That policy succeeded. In the space of a few decades it contributed to the development of sophisticated centers of defense technology across Western Europe and in the Western Pacific. **The policy also led to significant peacetime overcapacity in the defense industries worldwide, and to intense international competition for sales of high-technology weapons.**

Superiority in military technology over potential adversaries has been the explicit foundation of U.S. national security policy for 40 years. Technological leadership over our allies has been implicit in that policy. That superiority is declining, in part because of our own efforts to assist our allies. **The loss of technological supremacy may be an unavoidable long-term cost of maintaining strong security alliances. It might also be the price of gaining access to foreign defense technology in the future.** Cooperation in defense technology is accelerating this process, and helping to undermine the U.S. national security posture of designing and fielding defense systems at least a generation ahead of the competition. **However, the changing nature of the military threat makes this an appropriate time to reevaluate our basic national security strategies and goals.** Because the threat is changing, the character of our alliances is likely to change as well.

If tensions associated with trade and technology competition between the United States and Japan continue to escalate, **the traditional separation between economic affairs and the U.S.-Japan security relationship probably cannot be maintained.** This became evident in the controversy over the transfer of F-16 fighter technology to assist Japan in building its new fighter aircraft, the FSX. For the first time, military and trade issues were intertwined in an open, and sometimes acrimonious, public debate. It became clear in the course of this debate that the U.S. Government lacks a coordinated policy or institutional mechanism by which to address specific cases like the FSX, or to resolve general questions arising from armaments collaboration with its allies. The issue remains unresolved, and **it is probable that the FSX controversy will be revisited the next time a major codevelopment program is proposed with an ally.**

In Europe, maintaining cohesion within the NATO Alliance has always been a balancing act, even in the face of a common threat from the East. Achieving rationalization, standardization, and interoperability of Allied weapons has proved to be an elusive goal. Armaments cooperation among the NATO Allies should have political benefits as well, but as the Nunn amendment programs have demonstrated, involving many governments in codevelopment lowers the odds of a successful outcome.[1] As the **perception of the Soviet threat to Western**

[1]The Nunn-Roth-Warner amendment to the FY1986 Defense Authorization Act authorized funding for NATO cooperative R&D programs, and has received an appropriation each fiscal year as follows: FY86, $100 million; FY87, $145 million; FY88, $150 million, and FY90, $117 million. The results have been uneven, however, due to the difficulty in harmonizing military requirements and to the multiplication of regulation and administration.

**Europe diminishes, perhaps in consort with real conventional force (CFE) reductions now being negotiated in Vienna, the military, economic, and political interests of the United States and its European NATO Allies may diverge significantly.**[2]

Such divergence will be exacerbated by increased competition between the U.S. and European defense industries for shrinking defense funding. U.S. defense exporters look to European markets as a safety valve against anticipated steep declines in the U.S. defense budget, and European firms seek to penetrate the U.S. defense market, which is still by far the largest and most lucrative in the world. **International collaboration among defense companies appears to be increasing at a time when transatlantic intergovernmental cooperation in defense technology has become increasingly problematic.** Interdependence for the best defense technology is fast becoming a fact of life.

Concurrently, competition between U.S. and European defense companies will escalate as they seek to export sophisticated weaponry to maintain revenues and keep production facilities open in a declining market. As U.S. influence over European sales to the Third World decreases, differences in the political and economic interests of the United States and its NATO Allies will become more important. **It is possible, for example, that the United States will need to project power into regions and against countries that have been armed by the Europeans.**[3] In that case, the United States will have to design its weapons systems against European standards, and the question of what defense technology is transferred to Europe will become crucial.[4]

But here, as elsewhere, the interests of the United States and its defense companies may differ in important respects. Large U.S. companies that can operate internationally are entering into strategic market alliances and other business arrangements with European and Asian firms, transferring U.S. technology and subcontracting with them for portions of U.S. weapons systems. **Although defense collaboration makes business sense for individual companies, it may ultimately create unacceptable dependence on foreign suppliers, erode parts of the U.S. defense industrial base, and undermine U.S. foreign policy goals such as nonproliferation of delivery vehicles for weapons of mass destruction.**[5]

To complicate matters, even though it does create interdependence, **international collaboration also gives DoD access to foreign defense technology that may be superior to that produced in the United States.** Extensive procurement from foreign suppliers, however, coupled with a failure to support U.S. sources, could damage domestic defense companies. But a policy that guaranteed domestic sourcing from particular companies (or for a specific technology) might, in time, degrade domestic capability because there would be no foreign competition and, therefore, less incentive to innovate and to make investments in R&D.

As defense industries restructure their operations in response to overcapacity and declining defense budgets, there will be a few winners and many losers. **The United States could end up with a defense industrial structure inadequate for the defense of the Nation.** It is also possible that the United States will not need anything approaching the level of defense industrial capacity that it has built up over the past

[2]If economic integration in Europe proceeds smoothly, even in the event of accelerated German reunification, increasing trade competition between the Europeans and the United States may introduce additional complexities into the NATO equation.

[3]Many advanced European weapons systems have incorporated technologies initially developed or codeveloped by U.S. defense companies.

[4]This problem was demonstrated in the Persian Gulf when the *U.S.S. Stark* was struck by two French-made Exocet missiles.

[5]"At least 16 Third World nations now possess ballistic missiles . . . The United States has not transferred ballistic missiles to the Third World since 1974. The most recent and important source of missile technology for Third World missile programs is West European companies and individuals willing to sell technical and material assistance." U.S. Arms Control and Disarmament Agency, *World Military Expenditures and Arms Transfers 1988*, June 1989, p. 17.

three decades. **The challenge will be to convert the defense industries to an appropriate peacetime posture and still retain the capacity to mobilize in a crisis.**

Any proposed policy changes on international collaboration will have to be sensitive to the different kinds of companies that supply equipment to the Department of Defense. Large prime contractor companies that build and integrate whole systems generally see increased internationalization as a positive business trend. Some argue that international corporate alliances create access to new markets and superior technology, and will ultimately produce greater efficiencies by driving less competitive suppliers out of business. Smaller subcontracting companies that depend on DoD for most of their business worry about losing sales to foreign competition and about resulting damage to the U.S. defense industrial base. International dual-use technology producers may decide not to do business with the Defense Department if the rules and regulations are sufficiently onerous.

This OTA Special Report identifies and analyzes the principal issues related to international collaboration in defense technology, and provides some policy discussion. As an interim report, it does not include detailed policy options for congressional consideration: these will be included in the final report of the project in May 1991. **Additional findings on defense industry and technology are presented at the end of chapter 1, and the principal issues are discussed at the end of chapter 2.** Chapters 3-5 and appendices A-D provide background and analysis on which the findings are based.

Senator BINGAMAN. Thank you very much. We appreciate your testimony. Mr. Calaway.

## STATEMENT OF P. ROBERT CALAWAY, PRESIDENT, RESOURCE MANAGEMENT INTERNATIONAL, INC., AND FORMER DEPUTY DEFENSE ADVISOR FOR RESEARCH AND ENGINEERING IN THE U.S. MISSION TO NATO

Mr. CALAWAY. Mr. Chairman, I appreciate the opportunity to appear today and present my views on defense technology and trans-Atlantic trade. I have been asked to address three questions. The first has to do with the progress, as I see it of European defense technologies. The second, the status and prospects for intra-European collaboration in these areas. And third, the implications of this collaboration for the government—the U.S. Government—and the U.S. defense industry.

In my opinion, Europe has made great progress and on a broad front concerning defense technologies in the past decade. I think a review of the 1990 DOD Critical Technologies Plan tends to bear that out. The plan credits Europe with having significant contributions in 7 of the 20 categories overall.

I interpret "significant contributions" as meaning roughly equal to that which is possible in the United States. In 16 of the categories in selected areas significant contributions are credited, and in 3 categories in selected areas the Europeans are credited with being superior.

Now 10 years ago we would have discounted European technology almost entirely except in very, very limited areas. This progress that has been made since, has been driven in part by a convergence of political and technical initiatives that occurred around the middle of the 1980s. Four are especially noteworthy, and I think they do bear some comment.

In 1984, IEPG, the Independent European Program Group, Ministerial meeting in November in The Hague was, I think, quite significant. At that time, the ministers commissioned the so-called

"wisemen" study and two years later the wisemen produced the report, "Towards a Stronger Europe," in which they advocated a common European defense market.

The second initiative which I believe was pertinent was the French alternative to the U.S. calls for SDI cooperation, known as EUREKA, a basically civil multinational program partly funded by governments, partly funded by industry to address pre-competitive technologies in a broad sense.

The third was the initial set of programs under what is now called the European Community Framework Program of collaborative research and development in civil technologies. Two of the most prominent were the ESPRIT program and BRITE.

Finally, the Single European Act, which was passed by the European Parliament and ratified by the member nations, resulted in EC 92, has had an across-the-board impact—not only on economics in Europe but certainly on defense technology.

These four initiatives, I believe, have tended to put European science and technology on a fast track. You might argue that they did indeed start behind the United states and Japan a decade ago, but in some areas they may be advancing somewhat faster and appear to be catching up with the United States.

In my opinion U.S. policies have served as a catalyst for some of the above initiatives. Certainly the much-beleaguered technology transfer and COCOM issues and third country sales have been the catalyst which, in the view of many Europeans, was a U.S. Government-U.S. industry conspiracy to maintain a global competitive advantage for the U.S. Government. Those are pretty strong words, but I have heard that more than once.

The 1984 amendment by Senator Nunn, which was not passed, which suggested that the United States should consider bringing some troops home if certain steps were not taken by the Europeans, tended to focus a lot of the frustration in Europe, in part because they were afraid perhaps the United States indeed would pull back but also the fact that the United States was capable of making such a motion. And I think that had a great influence on, frankly, the November IEPG meeting.

How have they achieved these advances? I suggest that the primary mechanism has been through collaboration. Collaboration has long been used by the Europeans to spread the cost and technical risks of developments. They have been forced, because of the lack of money and the lack of resources, to learn how to work together and in some ways they have done this very well.

This collaboration has been focused largely in the past on major systems where there was a clear lack of resources or market size to make the effort economical. The pace has increased substantially since the mid-1980s. More money has been made available by government and collaboration has been extended to research and development especially in the so-called pre-competitive collaborative R&D, for example EUREKA, ESPRIT and BRITE.

There have also been firm Government commitments, individually by politicians but also through statements embedded in many European governments' procedures and budgets, that support collaboration, especially collaboration in pre-competitive research and development.

There has also been, since mid-1984, a definite Europe-first policy for collaboration. Although perhaps you do not see much of this in the press, it was pretty clear to European industry that they were being encouraged by their governments to seek a European partner first, and if they could not find one, then perhaps look to the United States. This was a fallout of an emphasis on industry-to-industry cooperation as well.

EC 92 also forced the European industry into a very painful but badly-needed rationalization. The fact that so many small business entities existed in Europe was one of the major reasons for their inefficiencies and their inability to compete with ourselves or to compete with Japan.

Today, however, we see this rationalization resulting in corporations, joint ventures or strategic alliances with technical and financial resources which I believe are on a par with many of our U.S. defense and aerospace giants. Consider the Siemens-GEC marriage, Deutsches-Aerospace, Thompson and MBB and others that have occurred. Those are pretty formidable competitors.

These alliances have also established regional and global marketing strategies and they have government support. They are also addressing civil as well as military markets. Not one of these groups that I mentioned is defense only, and they are addressing the entire spectrum of high technology markets and certainly they are looking quite anxiously toward Eastern Europe as a developing market.

They are also using technologies which are evolving from the framework and EUREKA-type programs that I mentioned earlier. As a result, we are beginning to see a definite impact the quality of their new products.

Some comments have been made regarding the nationalistic feelings within Europe and how this might tend to work against collaboration. I believe that European industrialists and European politicians see that a united Europe, an economically-united Europe, is the only way to go, and they are going to take the steps necessary to overcome the kinds of problems that they are faced with today.

I also see a growing confidence, especially in European industrialists—a stark contrast to what we saw perhaps 10 years ago, when the American industrialists were certainly a dominant force. We see a role reversal now in many fora.

What do I see as the implications of all of this? I think there are two basic ones. On the government side, the Europeans see advanced technology as key to their economic security. They have identified the key technologies and have established a framework of support. They are opting out of dedicated defense research in favor of generic pre-competitive research with dual use.

And in that sense they will be more and more reluctant to share these technologies in collaborative R&D programs with the United States if they are concerned that there will be restrictions on uses in civil markets or a loss of competitive advantage. I believe that as a result trans-Atlantic armaments cooperation could decline at a time when perhaps we need it more than ever.

On the industrial side, the European strategic alliances will take advantage of their advanced technology and secure global market

leverage while they have the opportunity. New products will emerge and, because they will be addressing strong and growing civil markets, they will see strong and growing sales and profits which they can then plow back into additional company or collaborative research.

This freedom to use the advanced technology across the board could result in a competitive advantage relative to our companies for European firms. In that sense, we will find ourselves caught in somewhat of a vise between the European and the Japanese industrial giants.

I would like to make one final comment, if I may, on critical or emerging technologies. In my opinion, the critical technologies list has been relatively constant for more than a decade. We have had a never-ending stream of studies. The 1990 critical technologies plan and the Commerce emerging technologies plan are perhaps the most recent.

The United States, Europe, NATO, industry, academia have all studied this problem in detail and have highlighted the same core technologies—telecommunications, optics, fiberoptics, advanced materials and so forth. Most of these are dual-use. They are critical to national security and to economic growth and trade.

Europe and Japan have established a framework for government, industry, academic cooperation in key technologies. The United States stands alone with no framework. The United States debates the contents of critical technologies without really addressing what to do to assure superiority or at least parity. The DSB Pacific Rim study called for a framework and several others—the National Academy of Sciences and DPACT and others—called for a framework.

I think government-wide support for selected critical technologies which are dual-use is important to do. It needs to be dissociated from any particular agency. It needs to be viewed as pre-competitive and generic. It is not industrial policy, in my view; it is just simply good business sense.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Calaway follows:]

Statement of
P. Robert Calaway
President, Resource Management International, Inc.

I appreciate this opportunity to appear before the Subcommittee on Defense Industry and Technology. Today our defense community is being confronted by an unprecedented set of challenges in the field of international cooperation. I have been asked to focus on three related topics. First, the progress of European defense technology. Second, the status and prospects for intra-European collaboration in defense technology. And third, the implications of these developments in Europe for United States Government policies and for America's defense industry.

The first two topics are closely linked. And I will, therefore, address them together. In the 1990 Critical Technologies Plan,[1] DoD and DoE have rated the technological capabilities of the NATO Allies in each of the 20 areas "considered to be the technologies most essential to develop in order to ensure the long-term qualitative superiority of U.S. weapons systems". Overall, DoD and DoE credit the Allies as capable of making major contributions in seven of the 20 technology areas and capable of making some contributions in the remaining 13. A more detailed review of the report indicates that in 16 of the technology categories, the NATO Allies are capable of significant contributions in selected areas and for three categories they are considered to be significantly ahead in some aspects. For all 20 critical technologies, the report identifies vigorous work underway in Europe, much of which is conducted under some form of collaboration. This DoD/DoE assessment testifies that significant progress has been made in Europe in the overall state of technology since the mid-1980s. And this progress has resulted from a number of political and technical initiatives which converged at about that time.

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1 "The Department of Defense Critical Technologies Plan", for the Committees on Armed Services, United States Congress, 15 March 1990.

-- In November 1984, the IEPG[2] ministers met in The Hague and commissioned its so-called "Wise Men" study which in 1986 resulted in its landmark report "Towards a Stronger Europe" proposing a future common European armaments market.

-- At the urging of the French Government, a major collaborative effort was undertaken, known as Eureka,[3] directed toward enhancing European commercial competitiveness in a range of keystone technologies.

-- A number of programs sponsored by the Commission of the European Community[4] were begun, directed toward collaborative "pre-competitive" research and development and aimed at enhancing the competitiveness of European Community members' industries.

-- A Single European Act[5] was passed by the European Parliament and ratified by the EC members launching the EC92 initiative with the goal of an integrated European economy by the end of 1992.

These events have combined to put European science and technology on a fast track, bringing European companies technically up to par with U.S. firms in many--some may argue

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2 Independent European Program Group - an informal forum of all European NATO members except Iceland designed to further defense-industrial cooperation among its members and strengthen Europe's contribution to the alliance in the defense equipment sector. Members are: United Kingdom, France, Germany, Denmark, Netherlands, Belgium, Portugal, Norway, Spain, Italy, Greece and Turkey.

3 European Research and Coordination Agency formally independent of the EC, which is a broad European Research and Development program which includes EC member nations, the EC commission and seven other non-EC European states.

4 The European Community Framework Programme designates focal areas in which research and development are to be invested. Currently the Community is in the overlapping second and third frameworks.

5 Single European Act is an act that was ratified by members of the European Community to enable the member nations to establish an internal market and create a unified European market by December 31, 1992.

in most--significant areas of technology. With few exceptions, these are the same technologies described in the 1990 DoD Critical Technologies Plan.

Europe's progress in science and technology has been largely accomplished through "banding together"--the pooling of Government, industry and academic resources to tackle commonly agreed objectives related to technology, markets and competitiveness. This is not a new phenomenon. Europe's Governments and companies have a long history of successful joint projects and have long recognized that independence in defense research and procurement was neither financially nor politically practical. What is new (or new since 1984) is the pace of activities in this area.

The November 1984 IEPG Ministerial perhaps was a watershed for European defense collaboration. There was at that time great frustration that Europe was falling behind the U.S. in research and technology and that U.S. technology-transfer and third-country-sales policies were stifling attempts to leverage Europe's defense capabilities via U.S. technology and know-how. There was also growing concern that the U.S. might begin to pull back from Europe--a concern that was heightened by the introduction of an Amendment in 1984 by Senator Nunn, suggesting that the U.S. should begin troop withdrawals if the Allies did not undertake specific steps to more equitably share NATO's defense burden.

The results of this frustration and concern were firm commitments by all IEPG members that collaboration was to become the rule not the exception--and a "Europe first" policy became a corollary to this rule.

The Single European Act perhaps provided for civil R&D collaboration what the 1984 IEPG Ministerial meeting provided for defense. With the political force of EC92 behind it, the European Community's Framework Program for collaborative research and technology simply had to succeed--and the findings in DoD's Critical Technologies Plan appear to testify that it has. EC92 also has prodded Europe's defense and high-technology industries into a painful but much-needed

rationalization. Through a series of mergers, acquisitions and strategic, intra-European alliances, the EC's industrial map has changed dramatically. We now see corporate groupings which can rival the U.S. defense and aerospace giants in resources, finances, technology and marketing. These new industrial giants operate with equal ease in civil and military markets--and make good use of technologies gained from previous and on-going collaborative efforts--especially those conducted under the EC Framework program.

In sum, European science and technology has advanced significantly in the past decade and is approaching par with the U.S. in many areas. The political emphasis behind EC92 and other forces have combined to drive European Governments and industries toward closer collaboration in science and technology, product development and marketing. While there remain nationalistic feelings and conflicts in specific areas, senior European Government officials and corporate managers recognize that these difficulties must be overcome if they are to enjoy the benefits of the united industrial Europe. In my estimation this trend will continue and Europe will become stronger and industrially more united in the 1990s.

Turning to the third issue--the implications of Europe's progress in defense technology for the U.S. Government and for America's defense industries. European Governments see advanced technology as the key to their future economic security. And most have set national technology priorities to support their industries in achieving competitive, high-tech products for both civil and military markets. Through the Independent European Programme Group, Eureka Program and EC Framework Program, Europe has identified its list of critical technologies. And nations are vigorously pursuing them, not only in R&D but in applications as well. With shared risks and clearly defined national and regional goals, the likelihood is high that state-of-the-art products will result in both civil and military markets. And the financial strength of a rationalized European industry will assure that they are competitive products as well.

European Governments appear to be rapidly opting out of

uniquely defense research in favor of more vigorous and collective funding for civil research and technology. While precise comparisons are hard to come by, the aggregate European investment in civil research and technology is roughly equivalent to that invested by the U.S. in defense research and technology. And indications are that Europe will expand its civil research programs and follow national and regional policies to exploit further the high-technology civil markets.

The Europeans see technology as generic in nature, with the applications stage the point at which defense needs are properly taken into account. Following this logic, controls based only on technologies can have serious negative effects on industries' abilities to compete in global civil markets. As civil technologies become more sophisticated and Europe obtains increasingly advanced technologies, our Allies may be increasingly reluctant to cooperate with the U.S. in defense research and development--especially if they suspect that the U.S. will attempt to impose restraints on the applications of shared technologies in other markets. The Europeans will be loathe to offer technologies developed, for example, under EUREKA, ESPRIT, BRITE or EURAM to a cooperative transatlantic defense program if, as a result, they would be constrained from using those technologies to exploit commercial telecommunications, information processing or commercial aviation markets.

The challenge for the U.S. Government is to establish export controls at the point where national security is ensured but commercial uses are not overly restricted. Basic research and technology should be considered to be more generic in nature, with controls established at the point where technologies are directly tied to a military system. At the same time these technologies should be available for the development of state-of-the-art commercial and civil products. If an accommodation of this nature is not reached, it is conceivable that the U.S. will find few Allies willing to join in collaborative research and development programs in the 1990s.

From the standpoint of industrial competitiveness, maintaining the *status quo* could result in European industrialists having largely unencumbered use of new technologies in commercial products while their U.S. counterparts are constrained by export control procedures and security--a competitive disadvantage for U.S. firms today in relation to Japanese companies. With the commercial incentive, European industries will also become more efficient in transferring technology for research in new products. And as sales from expanding commercial markets will far exceed those from declining military markets, European companies should enjoy proportionally more profits which can be cycled back into European collaborative research programs and new products, to the detriment of U.S. defense and commercial industries.

Commercial factors and the need to sustain global competitiveness for the U.S. defense industries must become integral to decisions on technology transfer and arms exports. Defense technology can no longer be viewed in isolation from the rest of the U.S. economy and defense cooperation can no longer be conducted in isolation from global competitiveness issues.

I would like to make one final observation regarding support of critical technologies. For more than a decade the U.S. and its NATO Allies have been searching for a means to collaborate on technologies which were considered critical to maintaining the West's historic "quality edge" over the Warsaw Pact in weapons and systems. Unfortunately, rather than getting on with the business of collaborating, non-productive time has been spent defining what technologies are indeed critical.

Since the late 1970s more than a dozen significant studies have been conducted with the goal of identifying this list--the 1990 Critical Technologies Plan being the most recent. Comments have been made regarding the "striking similarity" between the Plan's 20 critical technologies and those which have been identified for emphasis under the

IEPG's EUCLID[6] program or the EC's Framework Program. In fact, the critical technologies list has been relatively stable for more than 10 years. In 1979 NATO's Paris-based AGARD Group published its study of critical technologies entitled "Project 2000 (P.2000). In 1981 the Defense Science Board conducted a "Study on Technology Base," resulting in a list of 17 critical technologies. In 1982 NATO published "Land Operations 2000 (LO/2000)" and a report on the "Military Implications of the Loss of Sensitive Technologies to the Warsaw Pact". All of these studies identified sensors, computer software and hardware, microelectronics, materials, modeling, artificial intelligence and information processing as critical technologies.

We know what critical technologies will continue to provide the U.S. and its Allies with the most advanced weapons and systems. We also know that nearly all of these technologies will provide the U.S. and its Allies with competitive, state-of-the-art products for commercial and civil markets. The U.S., however, appears to stand alone in not acting on this "fact of life". Europe and Japan have done so by establishing a framework for a Government/ industry/academic collaboration on these technologies. This collaboration ranges from basic research through pre-competitive technology development and applications. It seems that the U.S., on the other hand, continues to debate which technologies are critical, not what to do to ensure U.S. leadership--or at least parity--in advanced technologies. The longer this debate continues, the greater will be the disadvantage for U.S. industries in increasingly competitive global markets. And the more difficult it will be for the U.S. Government to establish effective collaboration with Allies in military research, development and procurement.

I would like to thank the Committee for this opportunity today to express my views and would be happy to answer any questions or elaborate further on my remarks.

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6 European Cooperative Long-term Initiative for Defense is an IEPG program that emphasizes critical technologies for defense.

Senator BINGAMAN. Thank you very much.

Let me ask Dr. Bobrow first, I gather from the recommendations of your report and from your briefing here, and from what I saw when I was in Japan, that there are great opportunities for the United States to benefit from greater R&D cooperation, particularly with Japan but with several of the Pacific Rim countries, and you recommend a reorganization of DOD to try to derive some of those benefits.

Could you elaborate a little bit? If this committee, in the 1991 Defense Authorization bill, were to try to bring about that greater level of cooperation to the greatest extent possible, what would you advise us to direct DOD to do?

Dr. BOBROW. Should the Committee choose to move in that direction, I believe that the Task Force as a whole would clearly recommend the formula explicitly stated in our recommendation for internal reorganization within the Department of Defense.

This sort of reorganization has been suggested before, but never put into practice. Our view is that it is essential to make industrialists and responsible government officials overseas and in the United States confident that the risks and costs, political, economical and military, associated with actively exploring technology cooperation are worth taking. The reorganization can hold out clear prospects of resolutions in a reasonably timely way, rules of the game that are relatively well understood, and focal points of authority and information on the U.S. side.

We also feel that, without the changes suggested in the report, it is very difficult for the DSAA organization to convert to a set of activities and a set of skills and a set of missions which we think are more appropriate for the world of diffused technology excellence that has been either described or referred to by the other witnesses this morning. The difficulties follow from DSAAs history, the assignments it has had, the criteria that have been used for rewarding people, and selection for overseas assignments.

Senator BINGAMAN. Let me ask—and the other three of you can comment on this as well—an article that was in the Wall Street Journal on the 1st of May talked about this initiative that the Japanese have begun in intelligent manufacturing, where they are proposing over a 10-year period to spend something in the range of $1 billion to implement and develop intelligent manufacturing systems for factories.

And there are a variety of U.S. firms that I gather are indicating a real interest in participating in this. What is your view as to the appropriateness of U.S. firms participating in the Japanese initiative, and what is the appropriateness of the United States having its own initiative in this area?

Mr. CALAWAY. Well, everyone seems to be pointing my way. I advocate strongly that we encourage collaboration—international collaboration in advanced technologies across the board. I have done so since being out of Government, and I did so while I was in the Government.

I believe that if you isolate your scientists and engineers from what is happening in the rest of the world, you are going to miss out on a lot. We do not have a corner on the brains in this world.

So I think that it is very appropriate that we encourage collaboration, whether it be in robotics, intelligent manufacturing, advanced materials or any other subject.

I do believe, however, that we need reciprocity so that the results of these collaborative programs are not maintained only by a particular group, interest group or commercial group. Even though it may be industry-to-industry collaboration, we need an overall Government policy framework that will help guide industry toward these appropriate types of arrangements that will not only benefit European and Japanese manufacturers but American manufacturers as well.

Dr. KELLER. If I could just add to that, one of the places where the Japanese are very clearly ahead of us, is in their sophisticated manufacturing technology. We seem to have the scientific know-how, the 6.1, 6.2-type things, but they are much better at actually marketing and manufacturing these advanced techniques.

One of the points in your trip report in February, Senator, is that we have not made enough efforts to get technology from the Japanese. And this would seem to be a very good opportunity to do that.

Senator BINGAMAN. Do any of you have thoughts as to whether we should have an initiative similar to this? Or is that being done through DARPA's funding of research?

What are your thoughts on this?

Dr. BOBROW. My thoughts are that we should have a similar initiative, open to participation by Japanese firms. I think these cooperative activities can redound to our benefit. We have a lot to learn if our firms match the Japanese investment in them, not just of money but in terms of the kinds of people assigned, the duration of the assignment, and the professional rewards individuals will get for participating.

It is, however, very easy to have programs where the Japanese side is being much more serious and really getting more out of the opportunity than the U.S. side in terms of concrete matters in the lab and so forth.

I think we should have a program of our own. I have expressed as a personal matter my skepticism about DARPA (where I used to work and enjoyed working very much) or any other part of the DOD being able to provide fully appropriate leadership for something that will pervade advanced dual-use commercial applications and manufacturing industry, and not just defense and heavily defense-oriented firms.

While it would be wonderful for DARPA to have a role, I again come back to the principles of balance and ensuring that the Government voice and the Government steering be heavily influenced by a deep understanding of what competitive industry and competitive manufacturing requires—not the shielded manufacturing where DOD is the primary customer.

Senator BINGAMAN. To get the Government-wide and the commercial/non-commercial or commercial and defense perspective all wrapped-up in one, it has been our thought that the most obvious player with authority that might be used more effectively in this way is the President's science advisor and the Office of Science and Technology Policy (OSTP).

. We are considering proposing something to the defense bill in the nature of a FFRDC dealing with critical technologies which would provide assistance and staff support to the OSTP to do a better job of monitoring and urging coordination and trying to move us ahead in these critical areas.

That is an alternative to trying to set up an office of—or a department of science or technology which is another proposal that has been made and repeatedly rebuffed. I do not believe it has ever been embraced by any administration, but it is something that those of us in Congress have urged for some time.

I would be anxious, Dr. Bobrow, to get your reaction to the idea of providing additional staff support to OSTP to perform this integrating, coordinating role more effectively. To what extent would that be of help?

Dr. BOBROW. I think that is the most constructive way to proceed. I think the history of science policy, at the presidential level and executive office level, has been one of inadequately resourced agencies and offices trying to do what they could.

OSTP will need exactly the sorts of things you are proposing to be able to provide strong, comprehensive perspective and investment guidance.

I would urge that such an FFRDC be set up so that it is very easy and attractive for the operating departments of the Government to buy into its activities.

Senator BINGAMAN. Any of the other two witnesses have a comment on that suggestion?

Mr. Calaway, let me just ask you—you describe a situation in Europe where in the last five years the European allies have done a great deal to get their act together and begin to move forward in developing technologies in areas very important to us, both in defense and non-defense.

I do not see any great action on this side of the Atlantic in response to that. I do not see any initiatives coming out of the administration which indicate a concern about it, indicate an enthusiasm about it, indicate any reaction at all. Do you suggest that there are some specific things we ought to do here, in response to the items EUCLID and ESPRIT and EUREKA and all of the other things going on in Europe?

Mr. CALAWAY. Mr. Chairman, perhaps one of the reasons why we have not developed any visible response was because most of this work has been in the civil field. Whereas we were concerned with defense technology and have urged our allies to invest more in defense technology, they have quietly been upping the ante on the civil side.

I think that one of the steps that we should take in this country is to broaden our perspective of technology and establish a dialogue between our Government and the governments of the European Community between our Defense Department, our Commerce Department and others.

I think we are unnecessarily addressing a very limited audience if the DOD speaks to the MOD or to NATO. I think we need to broaden that substantially. We also need to develop a strategy for collaborating with these groups.

Sematech, for example, was closed to European participation so they created JESSI. And they said, if you want to participate in JESSI, we participate in Sematech. What is wrong with that?

And I think we can find many, many areas where we have mutual interest where we can gain some leverage on one another's investments. But we cannot just do it on the defense side.

Senator BINGAMAN. Any of the rest of you have a comment on that set of issues? [No response.]

Well, we have come to the end of our time here. Let me put into the record a statement that we have by Mr. Howard Fish, who is Chairman of the American League for Exports and Security Assistance, who wanted to have his statement included in today's hearing record.

[The prepared Statement of Mr. Fish follows.]

STATEMENT SUBMITTED BY

HOWARD M. FISH

CHAIRMAN

THE AMERICAN LEAGUE FOR EXPORTS AND SECURITY ASSISTANCE

I appreciate the opportunity to submit a statement for the record of the Hearing on International Defense Trade and Cooperation of the Subcommittee on Defense Industry and Technology of the Senate Armed Services Committee. I am submitting this statement on behalf of the American League for Exports and Security Assistance (ALESA), a trade association of 22 U.S. companies and 8 NATO affiliates with significant business in the United States. The purpose of ALESA is to promote government policies that facilitate American exports of defense products, so long as such exports are consistent with U.S. security and foreign policy interests.

Let me state at the outset that the Committee members and staff are to be commended for their efforts to stimulate further defense cooperation, and in particular armaments cooperation, in this time of monumental change in Europe. The Committee is well aware of the many problems which have plagued programs under the Nunn Amendment during the past five years. The low success rate for implementation of armaments cooperation projects, coupled with the expected decline in funding this fiscal year, indicate that the problems of the past will still be with us unless remedial action is taken to reinvigorate the program.

ALESA shares the concern of the Committee over the future of the Nunn programs. We have worked hard over the years to promote NATO defense cooperation, and encourage the Committee to continue urging the Department of Defense to identify, coordinate and follow through on a viable and sustainable set of joint projects benefiting those of us on both sides of the Atlantic.

The DoD task will not be easy. Cuts in defense spending throughout NATO, the scope and nature of which are yet unknown in many cases, will undoubtedly increase the level of competition for scarcer resources, with a likely tendency to accentuate protectionism. In this environment, the hand of those in DoD seeking to protect U.S. technology not just from the Soviet Union and what is left of its satellites, but from Western capitalist competition, is greatly strengthened. Simultaneously, the tendency in some quarters to declare that peace is at hand, and to neglect the NATO shield which contributed so largely to the present situation, means that defense cooperation may be shunted aside as an anachronistic legacy of the cold war era.

ALESA strongly opposes any such moves. We believe that the facts of the matter call for an entirely different conclusion--that in the present era of dramatic political change and declining defense resources, the imperatives for defense cooperation are greater that ever. NATO has been a bulwark against potential aggression for over forty years because of one simple but frequently overlooked fact--it has relied upon and maintained a qualitative edge to compensate for quantitative inferiority. ALESA members have contributed to that edge, and strongly believe that they must continue to do so in the future.

With dramatic force reductions anticipated in NATO Europe, ALESA believes that government and industry had best work together to ensure the highest possible quality of armaments for the forces that remain. Such cooperation, by bringing together government and industry representatives, also creates an infrastructure for communications which can promote greater political cohesion in the alliance. Contractor teaming across national boundaries within NATO adds to that cohesion, and can serve as both a practical stimulus to political cooperation and a complement to the Administration proposal to integrate the NATO ground force structure.

We are entering an era of great uncertainty, wherein the intentions of Moscow are almost universally deemed benign, but wherein her armaments have achieved a level of sophistication unparalleled in history. Under these circumstances, ALESA favors providing America and its NATO allies the best weapons systems which industry can produce, and at a cost which is sustainable by the alliance governments. We believe this objective can be best obtained through defense armaments cooperation, and that such programs should be strengthened for the overall benefit of the alliance. We believe that traditionally cited advantages of rationalization, standardization and interoperability, as well as economies of scale due to reduced costs and the elimination of duplicative R&D and production, continue to be as cogent a rationale for the programs as ever. We further believe that the necessity for strategic industrial alliances resulting from EC 92, added to the aforementioned need to maintain top quality forces in Europe, provide ample justification for expanding, not contracting, the Nunn programs.

ALESA companies have experienced first hand the advantages of defense cooperation in coproduction programs such as the F-16, AV-8B, MLRS and others. We are convinced that the potential for future cooperation is even greater. The reasons for this are twofold. First the defense industrial base, like the industrial base for civilian goods, is now more globalized than ever. In more and more cases the choice for companies seeking to retain market share and technological proficiency is not between participation in cooperative projects or making an outright sale, but of participating in cooperative projects or making no sale at all. Secondly, our NATO allies today have a greater capacity to provide reverse flow technology than in the past. ALESA sees armaments cooperation as a two-way street, with reciprocity the key to success in a wider range of joint R&D as well as production projects.

The question of how best to move forward on such projects is, of course, a major concern for both government and industry. We at ALESA have no simple prescription for success but do wish to focus attention on a speech delivered March 15, 1990 by Ambassador William Taft on the future of defense and industrial collaboration in NATO. In his remarks the Ambassador recommended four courses of action to promote defense cooperation. First, he suggested early agreement on military requirements, fully utilizing the expertise of the NATO conventional armaments planning system. Second, he urged easing technology transfer constraints within the Atlantic Community. Recent Administration liberalization of COCOM restrictions may make this somewhat more feasible. Third, he urged a comprehensive view of our industrial base, pointing out that civilian technologies increasingly lead military technologies in the same field, and that foreign expertise in wide areas of dual-use technology now surpasses that of the United States. Finally, Ambassador Taft called for a NATO defense GATT to overcome protectionism and subsidization, and to

establish standards for third country sales. While ALESA would reserve judgment about the advisability of a NATO Defense GATT, we do agree that rules to govern the sharing of technology need to be further elaborated.

ALESA would also like to share with the Committee the benefit of our members' experience in implementing projects under the Nunn Amendment. First we believe that the record demonstrates that successful programs are those initiated by industry on both sides of the Atlantic, with industry playing the key role in identifying, researching and developing the technology to be shared. U.S. and foreign companies which know each other and have experience dealing with each other are far more likely to come up with viable projects than any imposed by government. Second, we believe that government has performed best when it has not only supported industry with seed money furnished under the Nunn program, but has ensured that the structure to implement the program is kept as simple as possible. Multiple lines of governmental decision making on the project serve only to complicate, delay and even kill the program. We note that associate contractor agreement, coupled with a Memorandum of Understanding stating program objectives along with guidelines for implementation, has provided just such a simple structure to support the needs of industry. Third, we have seen that projects work best when the number of international partners is kept to a minimum. Complex projects with numerous foreign partners have two strikes against them to start with. A fourth conclusion is that user agency support is vital. This may not be the Services in all cases, but at least Service neutrality is required. If DARPA or another agency take the lead in project support until the relevant Services see advantages in their support, the program can still have a reasonable chance for success. Finally, the type of project likely to succeed is one which can demonstrate the advantages of emerging technologies for future force structure. Projects seen to compete with existing programs are also seen to compete with existing funds. The key to success in programs to date has been for companies to mutually leverage each other to prove a new concept, with each country then applying that concept to meet its own needs.

ALESA also invites the attention of the Committee to the functioning of DoD for international defense cooperation. There are at the present time at least 20 DoD directives which refer to technology transfer and defense cooperation. These directives were written over a 31 year period and reflect the purpose for which they were issued at the time--some to foster more defense cooperation and some to control it for fear of leakage to the Soviet bloc. These directives need to be rewritten to establish clear guidelines for limiting the restraints on technology transfer to only those absolutely necessary. Another need in DoD is enhancement of the international side of USD(A). As of today there has still not been a deputy for international programs named by the Administration. The office the new director will head needs to be beefed up, both in the number of personnel assigned for defense cooperative projects and in terms of authority to require timely initiation of feasible projects by the Services.

ALESA supports a stronger U.S. role in promoting armaments cooperative projects with our NATO allies. We stand ready to assist the Committee in fostering the changes needed to make such projects a reality.

Senator BINGAMAN. I appreciate very much the testimony. I think it has been useful. We have a lot of different issues here we are struggling with and trying to find ways to be helpful. And if you have additional thoughts, please let us know. We are anxious to continue to work with you on these subjects.

Thank you all very much, and that will conclude the hearing.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR JEFF BINGAMAN

EXPORT CONTROLS

Senator BINGAMAN. COCOM has now decided to substantially curtail the number of dual-use items subject to export controls, and has reduced the extent of controls on many Items still controlled. More sweeping changes are promised for the near future. Presumably these changes will have a major impact on the workload of some of the U.S. Government agencies involved in administering export controls. How many licenses did the Defense Technology Security Administration (DTSA) review in the following categories in 1989?

Mr. YOCKEY. (Provided by category):

4,197 — Free World.

689 — Emerging Eastern European democracies (Czechoslovakia, Poland, Hungary, and East Germany).

102 — Other Eastern European countries (Romania, Bulgaria , and Albania).

1,664 — The Soviet Union.

Senator BINGAMAN. If these 1989 licenses were processed under the new agreement, how many would be:

— decontrolled

— given national discretion treatment

— given favorable consideration treatment

— remain as general exception items

Mr. YOCKEY. To attempt this recategorization would entail reprocessing these licenses in light of standards that are still evolving. Of the 120 Industrial List Items, 30 have been identified for immediate, complete decontrol and another 8 are under review for possible decontrol by August 15. Most importantly, COCOM members are to construct by the end of this year an entirely new "Core List" in place of the current Industrial List. Clearly, the changes expected by the end of the year will significantly affect the disposition of cases—which is just what the President intended in the U.S. proposal accepted by our partners.

Senator BINGAMAN. What impact will these COCOM decisions have on the Defense Technology Security Administration's requirement for personnel and funding in fiscal year 1991?

Mr. YOCKEY. Implementing in the coming fiscal year the major decisions of this month's High-Level Meeting in Paris will heavily engage the export control elements of all concerned departments, including, of course, DOD. Our resource needs to cope with mandated requirements have already been stated and remain valid. License application review is just one part of DTSA's workload and broad responsibilities in trade security policy. However, we expect that export cases to Eastern Europe and the Soviet Union will become increasingly more complex as controls on less sophisticated technologies are modified or removed. Higher fences around fewer, more militarily sensitive technologies, will require more time-consuming technical and security analysis. On balance, DTSA expects its case workload to increase in complexity, which will offset any decrease in case volume. We and our colleagues in other departments will concentrate and redeploy resources to accomplish the sizable tasks before us.

Senator BINGAMAN. What is the "value added" by DTSA on dual-use exports which are reviewed by the Department of Commerce?

Mr. YOCKEY. COCOM members have agreed that the purpose of export controls is to protect goods and technologies which could make a significant contribution to the military capabilities of potential enemies and thus adversely affect our collective security. The Defense Department of each COCOM member government has unique capabilities for judging how and to what degree sensitive goods and technologies can be turned into military uses, and for making national security judgments. DTSA, consulting with the military services and other Defense Department components, carries out this responsibility.

Senator BINGAMAN. For exports to the Free World and to those Eastern European countries which qualify for national discretion treatment or favorable consideration, what unique knowledge, skill or expertise does DTSA bring to the license review process (as distinct from the control list creation process)?

Mr. YOCKEY. In addition to relevant military, defense and national security expertise as referred to in the previous answer, there are many other contributions to the license process by DTSA and other Defense components it draws upon. Their missions give to them considerable expertise in examining politico-military and economic-defense issues. Also, they possess a vast array of the scientific and engineering talent best able to make authoritative decisions in this area. Furthermore, DOD's intelligence collection and analytical resources are vital to understanding what potential enemies need and how they are attempting to make up their shortfalls. DOD reviews only a fraction of the export cases processed each year, with our attention focussed on the more sensitive ones.

TECHNOLOGY COOPERATION WITH JAPAN

Senator BINGAMAN. There has been a great deal of confusion over the proposals for technology cooperation that have been exchanged by the Defense Department and the Japanese Defense Agency. Where do we now stand in this exchange of proposals? What are the problems that are preventing faster progress? What is your timetable for turning proposals into actual projects?

Mr. YOCKEY. The Japan Defense Agency (JDA) proposed five areas for technological cooperation in October 1988. DOD responded in February 1989 that we were interested in two and possibly a third. Since then we have included a third topic. There have been several meetings with JDA since then. This February, during his visit to Japan, Secretary Cheney proposed seven additional areas for consideration. In discussions with the JDA in March, we agreed that the best way to deal with these topics was through the establishment of Technical Working-Groups (TWG) under the Systems and Technology Forum (S&TF). Two have already met, and several are being planned. We hope to agree to the overall TWG structure at the next S&TF meeting later this year. Both sides agree that TWG meetings will allow our experts to quickly analyze the potential for cooperative projects and to implement agreed projects.

STAFFING FOR TECHNOLOGY COOPERATION WITH PACIFIC ALLIES

Senator BINGAMAN. The Defense Science Board Task Force on Defense Industrial Cooperation with Pacific Rim Nations recommended that additional staffing for industrial and technological cooperation with Pacific allies be drawn from heavily-staffed security assistance activities. What is your position on this recommendation?

Mr. YOCKEY. In November 1989, the Deputy Under Secretary of Defense (International Programs) and Director, Defense Security Assistance Agency, signed a joint message expanding the functions of in-country security assistance personnel. As a result, the in-country DOD organization, where appropriate, is now the focal point for all efforts to increase cooperative weapons systems research, development, acquisition, and support reflecting the increased importance of the PACRIM area.

VISITS TO JAPAN BY DOD OFFICIALS

Senator BINGAMAN. One fact that is often used as evidence of our lack of interest in Japanese technology is that no Director of Defense Research and Engineering from the U.S. Defense Department ever visited Japan during the 1980s. To his credit, Robert Costello did travel to Japan as the Under Secretary for Acquisition. Do you, Under Secretary Betti, or Dr. Herzfeld plan to visit Japan in the near future?

Mr. YOCKEY. Under Secretary Betti is planning to visit Japan and other allies in the Pacific Rim later this year. Several visits to Japan by the Under Secretaries for R&E had been planned, but unfortunately had to be canceled. The Deputy Under Secretaries for International Programs and Research & Advanced Technology have met with Japanese officials numerous times and will continue to do so.

PACRIM STUDY

Senator BINGAMAN. One of the written questions that Senator Nunn asked you in advance of your confirmation hearing was a request for your views on the Defense Science Board report entitled *Defense Industrial Cooperation with Pacific Rim Nations*. Your response on February 12 was as follows: "After a brief examination, the recommendations appear to have merit. I understand they are being examined

within the Department. If confirmed, I intend to study the Department's position on these recommendations and support the acquisition related ones which assist the Government in advancing Pacific Rim contacts and ventures." Now that you've had more time to study the report, can you be more specific about the Defense Department's position on its 12 recommendations?

Mr. YOCKEY. Although heavily oriented toward commercial/industrial interests, this report provided several sound recommendations regarding the improvement of Defense Industrial Cooperation (DIC) with PACRIM nations. The changing world threat environment and the growing intensity of international economic issues in the world arena and have instituted improvements to our DIC policy and procedures accordingly.

Specifically, we are working much closer with State and Commerce facilitating improved coordination of defense, economic and political issues on DIC programs. We are in the process of updating and consolidating policy and procedures guidance for DOD participation in international exchange, cooperative and coproduction programs (DOD Directive 2000.9, Participation in Exchange, Cooperative and Coproduction Programs). Our objective is to complete this complex task by October. Also, the DUSD(IP) and Director of DSAA expanded the responsibilities of in-country Security Assistance Officers to encompass broader aspects of defense industrial cooperation. We have been actively pursuing programs of cooperative logistics and maintenance in the PACRIM region where there is opportunity for mutual benefit. The U.S./Australia Logistics Memorandum of Agreement, U.S./Thailand initiatives and depot/intermediate level maintenance activities throughout PACRIM are recent examples. We are satisfied with and confident of the progress we are making with defense industrial cooperation in the PACRIM region.

Senator BINGAMAN. Subchapter II of the Arms Export Control Act, including section 2761, pertains to Foreign Military Sales (FMS) transactions. Paragraph (e) of section 2761 (22 U.S.C. 2761(e)) specifies that FMS sales of Major Defense Equipment (MDE) shall include recoupment charges to recover a proportionate amount of the Defense Department's nonrecurring costs of research, development and production.

For each of the past 5 years, please indicate the total-recoupment payments received under the recoupment program and identify the U.S. Treasury accounts to which such payments were posted.

Mr. ROWEN. Nonrecurring Cost (NC) Recoupments (millions):

| FY85 | FY86 | FY87 | FY88 | FY89 |
|---|---|---|---|---|
| $196.1 | $152.3 | $335.6 | $159.2 | $148.2 |

NC charges are posted to Treasury Miscellaneous Receipts Account 3041 or 11X4116.3, as applicable.

Senator BINGAMAN. Please describe whether and how the recoupment payments allocated to, or on behalf of, DOD by the Treasury Department are allocated within DOD to augment its congressionally authorized appropriations, and explain whether and how such payments serve to offset the actual DOD outlays for a given fiscal year.

Mr. ROWEN. The Treasury Department does not allocate the recoupment payments to DOD. In the annual budget submission to Congress, the total projected spendouts for each fiscal year are reduced by the total offsetting receipts, which include projected NC receipts, to determine the estimated outlays in each year. The funds are not actually issued to DOD for use but, without their use as offsets to expenditures, DOD's budget programs would have to be reduced to stay within expenditure limits.

Senator BINGAMAN. In view of the fact that the recoupment provisions of 22 U.S.C 2761 apply only to FMS sales of Major Defense Equipment (MDE), on what legislative authority does DOD base its assessment of recoupment charges on:

(a) FMS sales of non-MDE end-items and components, modification kits, technical data packages, and computer software;

(b) Direct foreign sales of products and technology transfers by U.S. companies; and

(c) Domestic sales of products and technology transfers?

Mr. ROWEN. NC were recouped prior to enactment of 22 U.S.C. 2761 [Arms Export Control Act (AECA) Section 21(e)] in 1976. Prior to AECA enactment, U.S. law did not specifically require recoupment of NC, but did require that we recoup full costs to the U.S. Government on FMS. The effect of enactment of AECA section 21(e) was to limit the ability to waive NC on sales of MDE to certain countries. This has been

reaffirmed through documents such as General Accounting Office Report GAO/NSIAD 86-44, February 1986, "Cost Recovery - Collecting Research and Development Costs on Commercial Military Sales."

NCs are based on DOD investment and estimated production quantities for the DOD, including FMS, and commercial sales. If projected commercial sales of MDE were excluded from the sales calculation, the values of NC surcharges on FMS items would drastically increase FMS costs, reducing FMS value as a U.S. foreign policy tool.

AECA section 21(a) authorizes the Secretary of Defense on behalf of the President to make non-MDE sales and, in doing so, to set the terms on which those sales will be made. Contract obligations to reimburse the U.S. Government for commercial sales, whether foreign or domestic, are included on RDTE acquisition contracts through the DOD Federal Acquisition Regulation Supplement (DFARS, 10 U.S.C. 2202).

Legislation is not specific concerning items on which costs will be recouped. DOD policy balances the costs of NC collection with probable receipts, while striving to be fair to commercial producers and to U.S. taxpayers in general. These policies enable commercial marketers to use data which have been developed at Government expense to produce items and enable NC proceeds to be returned to the Treasury. This facilitates direct commercial sales by allowing data or technology financed by the U.S. Government to be used for production to support both FMS and commercial marketing efforts.

It should be noted that certain commercial sales result in significant NC proceeds. To charge NC only for FMS would deprive the Treasury of an important source of revenue, as well as resulting in uneven treatment of FMS and commercial sales. For example, the Japanese F-15 program (a commercial licensed production program) carries an NC of $1.6 million per aircraft. Based on the current program quantity of 187, this will result in Treasury receipts of $299.2 million.

Senator BINGAMAN. For each of the past 5 years, please indicate: (1) the total number of non-FMS transactions subject to recoupment charges; (2) the number of waivers of recoupment charges that were requested; and (3) the number and total dollar volume of such requests that were granted. Please provide the same information for FMS transactions.

Mr. ROWEN. Neither the number of transactions subject to recoupment charges nor the number of waivers requested are accumulated for FMS or commercial sales. To date, the approximate number of items that are subject to recoupment for FMS or commercial sales is 1,500. The numbers of requests for waivers granted and their values for the last 5 full fiscal years are—

| FY | FMS Val(000) | FMS # | Cml Val(000) | Cml # |
|---|---|---|---|---|
| 89 | $ 31,422 | 73 | $ 5,916 | 4 |
| 88 | 122,141 | 81 | 11,430 | 6 |
| 87 | 426,122 | 47 | 83,789 | 6 |
| 86 | 44,483 | 31 | 6,920 | 11 |
| 85 | 272,477 | 19 | 2,194 | 2 |

For further information, report GAO/C-NSIAD-89-12, March 1989, "Foreign Military Sales - Cost Waivers Granted to Foreign Countries and Benefits to the United States," contains a good analysis in this area.

Senator BINGAMAN. With respect to the charge for "derivative items," how will DOD determine the amount assessed on a product that has 10 percent common parts with a defense item?

Mr. ROWEN. The responsible military department conducts an engineering assessment to determine the number of parts common between the defense and commercial items. A percentage representing the commonality is then calculated. The share of the recoupment charge is determined by applying the percentage to the nonrecurring costs associated with the defense item.

Senator BINGAMAN. Does DOD continue to assess recoupment charges once it has collected recoupment payments equal to the Defense Department's total NC of RDTE and production for the particular product or technology?

Does DOD monitor and track the amount of recoupment payments received for each product, including derivatives and technology transfers, so as to determine when the amount of recoupment received equals the Defense Department's total NC costs of RDTE and production pertaining to such product?

Mr. ROWEN. Since the charge is to "recoup" a proportionate amount or a fair price, the total amount of NC receipts may not exceed the investment cost pool. This situation does not normally arise because the anticipated production numbers are rarely realized.

DOD does not monitor and track the amount of recoupment payments received for each product since this would be cost prohibitive. The charges are reviewed annually and, if certain criteria exist, the charges are revised.

Periodic analyses of NC by DOD and outside auditors indicate that overall recoupments roughly offset nonrecurring RDTE and production costs.

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## QUESTIONS SUBMITTED BY SENATOR SAM NUNN

### SCIENTIFIC-ATLANTA CASE

Senator NUNN. On December 15, 1989, Mrs. Eleanor Spector, the Deputy Assistant Secretary of Defense (Procurement), advised the Embassy of the Federal Republic of Germany (FRG) that the procedures followed by the FRG on a procurement of a Naval radar cross-section measurement system were "not consistent with the MOU and resulted in a U.S. company, Scientific-Atlanta, Inc. (S-A) being treated unfairly." In an April 15, 1990 letter, FRG Defense Minister Stoltenberg assured me that S-A's expenses related to this contract competition "will be met in accordance with the provisions of the German law of contract to the extent they are found to be legitimate."

Is your office monitoring this case to ensure that S-A is fairly compensated?

Mr. YOCKEY. We have followed the progress of Scientific-Atlanta claim for reimbursement of bidding expenses concerning the procurement mentioned in the question. On February 14, 1990, Scientific-Atlanta submitted an invoice for its bidding expenses to the German procurement agency, the Bundesamt Fur Wehrtechnik Und Beschaffung (BWB). The BWB requested on April 11, 1990, a detailed breakdown and explanation of the invoice. Scientific-Atlanta submitted such a breakdown in early June 1990.

### ARMAMENTS COOPERATION

Senator NUNN. During your confirmation hearing, I expressed my deep concern over the setbacks that armaments cooperation has suffered in the last couple of years. The withdrawals and outright collapses that some cooperative programs have experienced have made the future of this method of acquisition very uncertain. I suggested that you visit our allies, reach a consensus with them on what should be done, and then vigorously promote that course of action up here on Capitol Hill. You agreed with my suggestion. Have you undertaken this effort to reinvigorate support for cooperation?

Mr. YOCKEY. I remain firmly committed to the principle of armaments cooperation and the measures we discussed in my confirmation hearing. As you may know, Under Secretary Betti recently visited our European allies in April and covered a wide range of issues, including armaments cooperation. I hope to similarly visit our European allies later this year to exchange views on ways to improve our cooperative efforts.

### COOPERATION AND COST SAVINGS IN HIGH-PRIORITY PROGRAMS

Senator NUNN. In your written statement, you identify the central question: "How do we achieve cooperation and cost savings in programs that have our highest priority—not our lowest?" What is your answer to that question?

Mr. YOCKEY. There are two immediate means we will employ within DOD: (1) Cooperative Opportunities; and (2) Programming Approach.

*Cooperative Opportunities.* First we have long had the requirement to assess the opportunities for international cooperation in all our acquisition programs, with review at each milestone. We have not been as rigorous as we should have been in those assessments in the past, and we are taking steps to strengthen the process.

We will engage our theater commanders (Unified Commands) and Offices of Defense Cooperation to assist us in obtaining realistic assessments of cooperative opportunities, and we will put a heavier burden on program proponents to seek out cooperative opportunities and accommodate the attendant needs of cooperative endeavors.

*Programming Approach.* Second, we intend to begin this year to build into our planning and programming process the assumption of international cooperation for selected programs. For selected programs, we will program for less than total cost with the consequent need and intent to supplement our program funding with funding from foreign partners who have similar requirements. The programs to which we will apply this programming method will be high priority programs that also meet criteria suggesting they should be, and have a strong potential to be, cooperative programs. We will seek international partners for these programs, and only if efforts to establish an international program utterly fail will we revert to a fully funded domestic program. When we program for a total budget that includes these selected "underfunded" programs, we will have to establish cooperative programs or give up some programs. That will provide stronger incentive to make cooperation work.

While DOD assumes responsibility for seeking and establishing cooperative programs, it obviously takes partners to cooperate. We need the support of Congress to make the United States an attractive partner. Too often we have proved an unreliable partner because of the vacillations of our annual authorization and appropriations process. Engaging in cooperative programs for our highest priority requirements will demand a united—and persistent—approach by the administration and Congress. Toward that end we will work closely with Congress to establish cooperative programs that make the best use of our limited resources.

[Whereupon, at 11:52 a.m., the hearing was adjourned.]

# DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1991

WEDNESDAY, JUNE 13, 1990

U.S. SENATE,
SUBCOMMITTEE ON DEFENSE INDUSTRY AND TECHNOLOGY,
COMMITTEE ON ARMED SERVICES,
*Washington, DC.*

## IMPLEMENTATION OF THE DEFENSE MANAGEMENT REPORT AND THE DEFENSE MANAGEMENT IMPROVEMENT ACT

The subcommittee met, pursuant to notice, at 9:16 a.m., in room SR-232A, Russell Senate Office Building, Senator Jeff Bingaman (chairman of the subcommittee) presiding.

Committee members present: Senators Bingaman and Wallop.

Committee staff members present: Andrew S. Effron, general counsel; and Geary T. Burton, counsel.

Professional staff member present: William H. Smith.

Minority staff members present: Jonathan L. Etherton and George W. Lauffer, professional staff members.

Staff assistant present: Melissa Ann Ramsey.

Committee members' assistants present: John Gerhart, assistant to Senator Bingaman; Jefferson B. Seabright, assistant to Senator Wirth; Terence M. Lynch, assistant to Senator Shelby; Patrick F. McCartan, assistant to Senator Wilson; Charles G. Pearcy, assistant to Senator Lott; and Eric H. Thoemmes, assistant to Senator Coats.

### OPENING STATEMENT OF SENATOR JEFF BINGAMAN, CHAIRMAN

Senator BINGAMAN. The subcommittee meets this morning to hold the third hearing on Secretary Cheney's Defense Management Report and Title II of S. 2440, which is the administration's legislative proposal to implement the Defense Acquisition System.

Today we will receive testimony from two Members of Congress, and representatives of the defense industry as well, offering their perspective as to the need for and impact of Title II of S. 2440 on the Defense Acquisition System.

In our previous hearing, we heard from the Department of Defense, the General Accounting Office, the DOD Inspector General and the Public Contract Law Section of the ABA. Our hearings to date have demonstrated that while the general concepts behind the legislation contain the potential for reform, there are serious implementation questions that remain.

We have asked the Department to provide us with supporting documentation as well as answers to specific questions arising from our hearings. We look forward to those responses from the Department in order to enable the subcommittee to develop an appropriate legislative record to assess the proposals.

[The information requested is attached at the end of this hearing record.]

To ensure that all views will be considered, the record of the hearing will remain open until Friday, June 22, to permit receipt of any additional testimony that individuals or organizations would like to submit.

[All additional views submitted for the record are attached at the end of this hearing record.]

Senator Claiborne Pell and Representative Ron Machtley have introduced bills in their respective bodies that would address the issue of uncompensated overtime in the Government's acquisition of professional and technical services.

The bills address some concerns in the procurement of such services and is worthy of consideration by our subcommittee. To complete the legislative record on the issue, we look forward to receiving the Department of Defense's position on this important matter.

[See additional inserts for the record.]

Senator Pell and Representative Machtley are with us this morning, and we welcome them to the subcommittee today.

I think, rather than introducing the second panel at this time, that I will just defer to Senator Pell and Congressman Machtley to go ahead and make their statements. And then after they have completed their statements, then we will have introductions of the next panel.

Senator Pell, we appreciate you being here and look forward to hearing from you.

## STATEMENT OF HON. CLAIBORNE PELL, A U.S. SENATOR FROM THE STATE OF RHODE ISLAND

Senator PELL. Thank you very much indeed, my friend and colleague, for putting us on in this way. And members of the committee, I thank you for this opportunity. And I am pleased to note the bill is co-sponsored on the Senate side by Senators Heflin and Shelby.

I would like to acknowledge at the outset that I realize the problem of uncompensated overtime is a complex one and certainly not suitable for easy solution. I also recognize the subcommittee and its parent committee want to avoid wherever possible micro-management of the affairs of the DOD. But I hope, Mr. Chairman, these considerations will not inhibit your subcommittee from grappling with a problem of providing appropriate legislative guidelines to bring the practice under control.

In my own view the problem had its roots, particularly, as far as the Navy is concerned, in unrelenting pressure for competitiveness—the new buzz word. Even in the decade of the 1980s, when defense dollars seemed plentiful, the Pentagon's view that it had no obligation to regulate bidding practices had a pernicious effect.

Contractors prepared their bids to the bone by allocating 48- or 50-hour work weeks or longer to professional and managerial employees who received no overtime pay because they are exempt from the Fair Labor Standards Act. In evaluating those bids, the DOD simply suspended judgment about the wisdom or propriety of such practices, figuring that the Government is getting a cheaper product regardless of the means.

There is a contrary view that was expressed by your counterpart committee of the House which declared that uncompensated overtime "does not provide the Government the best value for the dollar in the long run." And as the result was pernicious in the well-to-do, affluent 1980s it is bound to get worse as the defense budget shrinks and competitive pressures escalate even further in the foreseeable future.

By any measure the practice of bidding uncompensated overtime is a bad practice. It is being termed, quite properly in my own view, as wage busting, an accounting gimmick and a competitive shell game—certainly bad practice from the point of view of the people who get caught in the squeeze and have to give away their time.

Dozens, literally dozens of them have written to me to complain about the hardships that result when their workweeks become arbitrarily extended with no compensating incentives. And it certainly is nerve-wracking for the competing contractors who have to participate in the uncertain charade, never knowing how much give away time is being bid by their own competitors or how much overtime their own professional work force can tolerate.

I would note it has a disproportionate impact on small businesses, who are heavily represented in my own constituency, because they have limited flexibility in adapting to artificial bidding practices. The failure of the Pentagon study mandated by your committee to recommend a solution has just complicated the problem. My own constituents advise me that not only has there been no improvement in the situation since the study was mandated, but there has been an actual escalation and increase in the number of uncompensated hours they are being asked to work.

Since Pentagon policy is not yielding any positive results, they have no alternative but to ask for statutory relief. And on the Senate side I, therefore, introduced S. 2239, which simply requires that bids in competitive proposals for the procurement of professional services by the Department of Defense be evaluated on the basis of a 40-hour work week. Such a standard would provide a level playing field for all contractors and would bring an end to a basically predatory practice which causes hardships for many.

I am aware there is not unanimity in the contracting as to the solution, and few favor approaches other than mandating bid evaluation on a 40-hour basis. I forwarded to your committee one such approach from a Connecticut contractor, Analysis and Technology, who also operates in my State, suggesting alternative accounting procedures.

I yield to the wisdom of your committee to determine the most appropriate course, but do hope that you will move forward on the issue and provide the legislative guidance where administrative action simply has not filled the vacuum or been effective.

I thank you for this opportunity.

Senator BINGAMAN. Thank you very much, Senator Pell.

Congressman Machtley, please go right ahead.

## STATEMENT OF HON. RONALD K. MACHTLEY, A U.S. REPRESENTATIVE FROM THE STATE OF RHODE ISLAND

Mr. MACHTLEY. Thank you very much, Mr. Chairman.

I would like to thank you for giving me the opportunity to join the distinguished Senator from Rhode Island to testify on his bill S. 2239.

The issue of uncompensated overtime has existed for too long in an era in which we are seeing decreasing tensions around the world and a lessening of defense dollars spent. I think it is going to create an even greater problem in the future.

In fact, during the last 6 years, we have seen a decline in real defense expenditures. Unfortunately, what is happening in the real world is that in order to compete for these dollars, the Navy, particularly, and other services of the Defense Department, are accepting and selecting contracts based almost exclusively on the lowest-cost submission. These bids include work which is generally more than 40 hours per week, and where the increased work hours are never compensated.

While many of us support the decrease in defense dollars based upon the world's activities, it is clear that we do not expect that the employees, the people who have in fact worked hard to build a strong defense industry, must in fact in their pay check realize the burden of these cuts.

Considering human nature to be what it is, I personally do not believe that the Defense Department is getting more for less dollars, but the contrary. I think from a public policy standpoint this concept of trying to get engineers and other very competent, educated and qualified people to work more than 40 hours, in many cases, 50 to 60 hours per week is, in fact, encouraging fraud, it is encouraging good people to get out of the industry and, for the long-run, it is going to mean, that our defense establishment is getting less for its dollars not more.

I think that management should not have to tell its employees that in order to get the next contract in a very competitive world, you are just going to have to work more hours or in fact will be unemployed. The threat is ever present. The employees understand that it is competitive. They understand that unless they voluntarily agree to work whatever the number of hours necessary to get the contract, that they may not have a job. And I think this is bad public policy.

The need for the highest-quality product at the lowest price, in fact, will always exist. And I think it is good policy to have the highest quality for the lowest price. However, I am concerned that the lowest price is becoming the dominant factor. And as I indicated, in the long run, I think that it is going to increase cost as well, as the best employees seek alternative employment in other areas other than defense-related professional services.

I think that what we are also going to see, and I am certainly seeing it from my constituents, as Senator Pell has indicated he is

hearing it from his, that we are hearing of lower morale, and we are hearing of greater turnover and absenteeism. Lowest-cost submission is certainly not good public policy. In order to stay in business, people understand that they are going to have to work enormous overtime to be competitive.

A recent survey of professional service contractors indicated that 31 percent of those who responded said that they were, in fact, using uncompensated overtime as a way of gaining employment. I would ask to submit that survey for the record subsequent to the testimony.

[The information is attached to submitted written testimony.]

Mr. MACHTLEY. Also, it has been shown that the senior document specialist—this is someone who has at least a bachelor of science degree and who has worked in the field for 5 to 8 years—under many contracts gets paid $6.50 an hour. I would suggest that most quality engineers are no longer going to stay in a field if they are going to be paid $6.50 an hour.

Unfortunately, the Department of Defense has told industry to try and organize itself so that there is, in fact, less uncompensated overtime. I would suggest that this is a paradox for industry because if industry gets together and makes some sort of agreement on how many hours they are going to bid on a contract, we will find that they will be clearly in violation of antitrust laws. It is really the Government's responsibility to make a level playing field.

We are not suggesting that DOD should not demand a high quality product. What we are suggesting is that every contractor ought to bid on the basis of a 40-hour week. Most engineers and most professional people who I am aware of are willing, and do in fact, work more than a 40-hour week. But the problem is that we are requiring them to work in excess of 40 hours and, as I indicated previously, sometimes 50 to 55, and even up to 60 hours a week, in order to get the contract.

As a rule, the Government's solution to the problem of uncompensated overtime should be to level the playing field to a 40-hour week. It is certainly possible under current accounting rules and regulations to "normalize" to 40-hour bids which call for workweeks exceeding 40 hours.

This is not to say that we are not going to encourage more overtime. It is not to say that we are not going to encourage higher product. But, clearly, government policy requiring excessive overtime, in the long run is going to result in less quality people and a lower quality product.

I would respectfully urge this committee to look at the public policy arguments supporting Senator Pell's bill (and mine in the House) and make the decision that we want, over the long-term, good people working in the Defense Department. And we want people who know that their jobs are not dependent on an uncompensated 50- to 60-hour work week, but dependent on the quality of their service, so that they too can be productive citizens.

Thank you very much, Mr. Chairman.

[The prepared statement of Congressman Machtley follows:]

STATEMENT OF REPRESENTATIVE RONALD K. MACHTLEY

MR. CHAIRMAN, I WOULD LIKE TO THANK YOU FOR ALLOWING ME TO APPEAR BEFORE YOUR SUBCOMMITTEE TO SHARE MY THOUGHTS ON AN ISSUE WHICH HAS BEEN RAPIDLY GAINING IN IMPORTANCE IN THE FIELD OF DEFENSE CONTRACTING. THE PROBLEM OF UNCOMPENSATED OVERTIME HAS EXISTED FOR TOO LONG, AND IT IS IMPERATIVE THAT CONGRESS AND THE DEPARTMENT OF DEFENSE CONTINUE TO WORK TOGETHER TO FIND AN APPROPRIATE AND WORKABLE SOLUTION.

IN AN ERA WHEN THE BERLIN WALL HAS FALLEN, EASTERN EUROPE IS DEMOCRATIZING, AND THE SOVIETS APPEAR TO BE LESS OF A MILITARY THREAT, IT IS INEVITABLE THAT THE PENTAGON WILL HAVE FEWER DOLLARS TO SPEND. INDEED, WE HAVE NOW SEEN SIX CONSECUTIVE YEARS OF A REAL DECLINE IN THE DEFENSE BUDGET. UNFORTUNATELY, THOUGH, IN AN EFFORT TO SCRIMP AND SAVE IN THIS TIGHT FISCAL ENVIRONMENT, THE PENTAGON -- PARTICULARLY THE NAVY -- HAS RESORTED TO ACCEPTING BIDS FOR PROFESSIONAL SERVICES FROM CONTRACTORS WHICH ARE BASED ALMOST EXCLUSIVELY ON LOWEST COST SUBMISSION. THESE BIDS INCLUDE WORK WEEKS OF MORE THAN FORTY HOURS WITH NO EMPLOYEE COMPENSATION FOR THIS OVERTIME. WHILE MOST OF US CAN SUPPORT CUTS IN DEFENSE SPENDING, THIS SUPPOSED MEANS OF SAVING SCARCE DEFENSE DOLLARS IS UNACCEPTABLE.

CONSIDERING HUMAN NATURE TO BE WHAT IT IS, I PERSONALLY DO NOT BELIEVE THE DEPARTMENT OF DEFENSE IS GETTING MORE WORK FOR LESS DOLLARS, BUT THE CONTRARY. I THINK THE PRACTICE OF UNCOMPENSATED OVERTIME ENCOURAGES POOR MORALE AMONG EMPLOYEES WHO MERELY EXPAND THE WORK OVER A LONGER OBLIGATED WORK PERIOD. WORKING IN EXCESS OF THE NORMAL FORTY-HOUR WORK WEEK IS NOT IN ITSELF A BAD THING; MOST HARD WORKING AMERICANS ARE WILLING TO MAKE THIS SACRIFICE. HOWEVER, RECEIVING NO PAY FOR THIS WORK AS A POLICY CAN BE VERY DEGRADING AND CAN DISCOURAGE PRODUCTIVITY FOR AN OTHERWISE PRODUCTIVE EMPLOYEE. MANAGEMENT SHOULD NOT HAVE TO TELL ITS EMPLOYEES THAT IN TODAY'S WORLD OF FEW CONTRACT DOLLARS, DESPITE YEARS OF FAITHFUL SERVICE, YOU, THE EMPLOYEE, MUST WORK WHATEVER IT TAKES TO WIN THE CONTRACT. THE THREAT IS EVER-PRESENT: WORK UNCOMPENSATED OVERTIME OR WE LOSE THE CONTRACT AND YOU LOSE YOUR JOB. THIS IS CLEARLY AN UNFAIR AND COUNTERPRODUCTIVE BUSINESS PRACTICE.

THE NEED FOR THE HIGHEST QUALITY PRODUCT AT THE LOWEST PRICE WILL ALWAYS EXIST IN THE MILITARY ACQUISITION BUSINESS. THIS PRINCIPLE SHOULD NOT BE CHALLENGED. HOWEVER, IT IS THIS CONCERN WHICH HAS DRIVEN CONTRACTORS TO INCLUDE UNCOMPENSATED OVERTIME IN THEIR BIDS. I AM EQUALLY CONCERNED THAT DOD'S CONTINUED ACCEPTANCE OF THESE BIDS MAY, IN THE LONG RUN, ACTUALLY WORK TO THE DETRIMENT OF QUALITY AND, IN FACT, INCREASE COST AS WELL, AS SKILLED EMPLOYEES LEAVE FOR A MORE PREDICTABLE WORK WEEK, OR AT LEAST ONE IN WHICH

ADDITIONAL TIME SPENT EQUATES TO COMPENSATION RECEIVED.

IN SUM, THE NEGATIVE EFFECTS OF REQUIRING UNCOMPENSATED OVERTIME -- LOWER MORALE, GREATER TURNOVER AND MORE ABSENTEEISM -- IN TURN, RESULT IN HIGHER COSTS IN OVERHEAD EXPENSES, SICK PAY, RECRUITMENT COSTS AND TRAINING. AND, BY ENCOURAGING UNCOMPENSATED OVERTIME, THE GOVERNMENT SIMULTANEOUSLY AIDS FIRMS WHICH, BECAUSE THEY CONSISTENTLY RESORT TO THIS PRACTICE IN ORDER TO STAY IN BUSINESS, PROVIDE A LOWER QUALITY PRODUCT.

THERE HAS BEEN MUCH QUESTION AS TO HOW WIDESPREAD THE PRACTICE OF UNCOMPENSATED OVERTIME HAS BEEN. ON THIS MATTER, I WOULD REFER TO A SURVEY TAKEN BY THREE TRADE ASSOCIATIONS DOCUMENTING USE OF THIS PRACTICE BY MEMBER FIRMS. THIS SURVEY CLEARLY ILLUSTRATES THAT THE PRACTICE IS WIDESPREAD. FOR EXAMPLE, 31 PERCENT OF THE SURVEY RESPONDENTS STATED THEY EMPLOY UNCOMPENSATED OVERTIME, MANY OF THEM REPORTING PERFORMANCE PROBLEMS ASSOCIATED WITH THE PRACTICE. I HAVE ATTACHED A SUMMARY OF THIS SURVEY FOR THE RECORD. (ATTACHMENT 1)

A SPECIFIC EXAMPLE I RECENTLY LEARNED ABOUT INVOLVED THE NAVY AWARDING A MAJOR CONTRACT TO A FIRM IN WHICH A SYSTEMS ANALYST WILL BE MAKING $6.50 AN HOUR AND A SENIOR DOCUMENTATION SPECIALIST $6.15 AN HOUR. THESE ARE COLLEGE B.S.-DEGREE EMPLOYEES WITH NORMALLY 5-8 YEARS OF WORK EXPERIENCE. HOW LONG WILL A SYSTEMS ANALYST WORK AT

THIS RATE BEFORE SEEKING A NEW JOB?

THE DEPARTMENT OF DEFENSE HAS OFTEN MAINTAINED THAT INDUSTRY ITSELF MUST COME UP WITH A SOLUTION TO THIS BIDDING PROBLEM, IN EFFECT POLICING ITSELF. HOWEVER, AS A FORMER LAWYER, IT SEEMS CERTAIN TO ME THAT WERE INDUSTRY TO REGULATE THE NUMBER OF HOURS BID ON CONTRACTS, IT WOULD CLEARLY BE IN VIOLATION OF ANTITRUST LAWS. AS A RESULT, I BELIEVE THAT ONLY THE FEDERAL GOVERNMENT CAN PROVIDE A SOLUTION TO THIS PROBLEM, JUST AS IT HAS IN ITS PROCUREMENT PRACTICES IN OTHER AREAS.

IN FACT, DOD AND OTHER FEDERAL AGENCIES DO SPECIFY DETAILS SUCH AS CATEGORIES OF LABOR, EXACT HOURS TO BE WORKED, AND EDUCATION REQUIREMENTS IN MANY OF THEIR REQUESTS FOR PROPOSALS. I HAVE ATTACHED A LIST OF SOME 24 OF THESE REQUIREMENTS WITH WHICH BIDDERS MUST OFTEN COMPLY. (ATTACHMENT 2) ADDING ONE MORE CLAUSE TO THIS LIST -- A FORTY-HOUR WORK WEEK REQUIREMENT -- WOULD BE QUITE APPROPRIATE.

AS A GENERAL RULE, THE GOVERNMENT SOLUTION TO THE PROBLEM OF UNCOMPENSATED OVERTIME SHOULD REQUIRE THAT CONTRACTORS COMPETE ON A LEVEL PLAYING FIELD. NO ONE CONTRACTOR SHOULD BE ALLOWED TO HAVE AN UNDUE ADVANTAGE -- SUCH AS A WORK FORCE THAT WILL WORK UNLIMITED

OVERTIME WITHOUT PAY -- OVER ITS COMPETITORS. I AM CONVINCED THAT ONLY BY REQUIRING BIDS WITH A STANDARD FORTY-HOUR WORK WEEK AND BY COMPARING NOT ONLY COST BUT QUALITY OF SERVICES PROVIDED, WILL THE GOVERNMENT OVER THE LONG HAUL REALLY GETS ITS MONEY'S WORTH ON FINAL PRODUCT RECEIVED.

THIS IS NOT TO SAY THAT THE EMPLOYEES OF FIRMS WINNING CONTRACTS CANNOT WORK MORE THAN FORTY HOURS TO PROVIDE A BETTER PRODUCT. IN FACT, THEY SHOULD BE ENCOURAGED TO DO SO, UNDERSTANDING THAT THEIR SUPERIOR AND PERHAPS UNCOMPENSATED OVERTIME WILL PUT THEIR EMPLOYER IN A PREFERRED POSITION FOR A FOLLOW-ON CONTRACT. HOWEVER, EMPLOYEES SHOULD NOT BE GIVEN THE UNDERSTANDING THAT REGARDLESS OF HOW HARD THEY WORK, THE FOLLOW-ON CONTRACT WILL BE AWARDED TO THE COMPANY WITH THE LOWEST PRICE BECAUSE OF UNCOMPENSATED OVERTIME. NO ONE SHOULD BE FACED WITH THE QUESTION, WILL THE COMPANY BID 60 HOURS/WEEK ON THE NEXT CONTRACT JUST TO STAY IN BUSINESS? OR WILL 75 HOURS/WEEK BE THE WINNING FORMULA?

I AM PLEASED THAT THE DEPARTMENT OF DEFENSE ADVISORY COMMITTEE ON UNCOMPENSATED OVERTIME HAS ADDRESSED THIS PROBLEM, AND HAS RELEASED ITS FINAL REPORT. I BELIEVE THAT THE COMMITTEE'S RECOMMENDATION THAT DOD AWARD CONTRACTS ON THE BASIS OF OVERALL VALUE RATHER THAN MERE LOWEST COST WOULD BE HELPFUL IN RECOGNIZING

THAT THE USE OF UNCOMPENSATED OVERTIME, BECAUSE OF ITS DETRIMENTAL EFFECT ON EMPLOYEES, LOWERS THE VALUE OF A CONTRACT. HOWEVER, I AM NOT CONVINCED THAT THESE RECOMMENDATIONS WILL EFFECTIVELY ELIMINATE THE PRACTICE OF MANDATORY UNCOMPENSATED OVERTIME. FIRMS WOULD STILL BE ABLE TO SUBMIT THESE PREDATORY BIDS, EMPLOYEES WOULD STILL SUFFER THE CONSEQUENCES, AND ULTIMATELY THE GOVERNMENT GETS AN UNACCEPTABLE PRODUCT.

MY LEGISLATION, HR 3651 (SENATE COMPANION S 2239), WOULD REQUIRE THE DEFENSE DEPARTMENT TO EVALUATE CONTRACTS FOR THE PERFORMANCE OF PROFESSIONAL SERVICES ON THE BASIS OF A FORTY-HOUR WORK WEEK. FOR THOSE CONTRACTORS WHO DO PROPOSE MANDATORY UNCOMPENSATED OVERTIME IN THEIR BIDS, THIS LEGISLATION IS INTENDED TO ALLOW THEM TO PROVIDE A COST SUBMISSION "NORMALIZED" TO A FORTY-HOUR PER WEEK BASIS. THIS "NORMALIZATION" TECHNIQUE ALLOWS CONTRACTORS TO SUBMIT BIDS CONSISTENT WITH WHATEVER ACCOUNTING SYSTEM THEY USE. LEGAL RESEARCH HAS ESTABLISHED THAT THE SECRETARY OF DEFENSE HAS THE AUTHORITY TO REQUIRE USE OF "NORMALIZATION" TECHNIQUES IN EVALUATING PROPOSALS.

THE PROFESSIONAL SERVICES COUNCIL, IN ADDITION TO OTHER GROUPS REPRESENTING PROFESSIONAL AND TECHNICAL FIRMS, HAS ENDORSED MY LEGISLATION. WHAT'S MORE, I HAVE HEARD FROM COUNTLESS EMPLOYEES OF THESE FIRMS WHO TELL ME OF ENORMOUSLY DIFFICULT WORKING CONDITIONS

WHICH ARE SOLELY DUE TO THE USE OF UNCOMPENSATED OVERTIME. IN SHORT, THIS IS AN ISSUE IN WHICH MANAGEMENT AND LABOR ARE UNITED. I URGE ALL MEMBERS OF THIS COMMITTEE TO TAKE A CLOSE LOOK AT MY LEGISLATION, WHICH I FEEL IS THE ONLY REAL SOLUTION TO THIS SERIOUS PROBLEM.

MR. CHAIRMAN, THANK YOU AGAIN FOR THIS OPPORTUNITY TO DISCUSS THIS IMPORTANT ISSUE. I WOULD BE PLEASED TO ANSWER ANY QUESTIONS THE COMMITTEE MAY HAVE.

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ATTACHMENT 1

PROFESSIONAL SERVICES COUNCIL
918 16th Street
Suite 406
Washington, D.C. 20006
(202) 296-2030

CONTRACT SERVICES ASSOCIATION
1350 New York Ave., N.W.
Suite 200
Washington, D.C. 20005
(202) 347-0600

SHIPBUILDERS COUNCIL OF AMERICA
1110 Vermont Ave., N.W.
Suite 1250
Washington, D.C. 20005
(202) 775-9060

May 26, 1988

Ms. Eleanor Spector
Deputy Assistant Secretary for Procurement
The Pentagon
Room 3E144
Washington, D.C. 20301-8000

Dear Ms. Spector:

The Professional Services Council, the Contract Services Association and the Shipbuilders Council of America undertook a survey of the industry on the practice of uncompensated overtime. The results were summarized and tabulated by Arthur Andersen and Company, a leading certified public accounting firm. Enclosed are the survey results for your information.

Some of the highlights of the report are:

- o UCOT is widespread; 31 percent of the survey respondents employ UCOT;
- o UCOT degrades performance;
  - 25 percent reported abnormal turnover associated with UCOT (in our industry which incurs an average of 15 to 20 percent turnover rate, a 6-7 percent increase represents a 35 percent increase in terms of people)
  - 43 percent reported difficulty recruiting staff to work on contracts involving UCOT

- 29 percent reported quality problems associated with UCOT;

o The average UCOT bid was 5.4 hours (e.g., 45.4 hours per week). The average among the "high" offerors was 7.4 hours per week, with 14 hours per week being the greatest number of uncompensated overtime hours bid in excess of 40 hours per week; and

o 59 percent of the companies polled (140) responded to the survey, an extremely large number which provides a high degree of statistical reliability.

We sincerely believe that the continuance and spread of this practice will lead to a serious degrading of the quality of professional and technical services that the government acquires, and that the survey results lend credence to our concerns.

Sincerely,

PROFESSIONAL SERVICES COUNCIL
Virginia Littlejohn
Executive Director

CONTRACT SERVICES ASSOCIATION
Gary Engebretson
President

SHIPBUILDERS COUNCIL OF AMERICA
John Stocker
President

ATTACHMENT 2

In a typical competitive RFP for professional and technical services, the Government includes many clauses that specify a number of requirements with which bidders must comply. These requirements are detailed and cover most every element of the offerors response including the technical, management and cost proposals. These requirements may include but are not limited to:

1) Specific categories of labor;

2) Detailed education and experience requirements for each labor category;

3) Specific person hours for each labor category, for each year of the performance period;

4) Travel and per diem allotments;

5) Material and other direct cost allotments;

6) Small and minority business subcontracting requirements;

7) Facility size and location;

8) Security clearance level;

9) Ceilings on indirect rates;

10) Unallowable direct costs such as usage of word processors;

11) Penalties for underdelivery of required person hours;

12) Key personnel and associated wage rates;

13) Number of Program Managers;

14) Relative ranking of evaluation factors;

15) Maximum base and award fee;

16) Payment terms and frequency;

17) Method for issuance of technical direction/task ordering;

18) Fee or other withholding provisions;

19) Specific equipment (computers, laboratory, test) requirements;

20) Apprenticeship and training requirements;

21) Specific service contract wages and fringe benefits;

22) Minimum ordering requirements in terms of either person hours or dollars;

23) Specific liability insurance requirements; and

24) Conflict of interest restrictions.

If the government can specify such detailed requirements in each of its RFPs, there is no reason that it cannot specify evaluation and award criteria based on a 40-hour workweek. A typical RFP includes hundreds of clauses which describe and specify the items noted above. One more clause which deals with leveling the playing field for the evaluation of uncompensated overtime should not be burdensome to either the government or the contractor community.

Senator BINGAMAN. Thank you very much, Congressman, I appreciate that. We appreciate the testimony of both of you, and your leadership in introducing these bills. And we will give them serious consideration. We have other witnesses who are going to address the same issues. And so we will try to consider this and see what we can do in the Defense authorization bill.

Thank you both very much for being here, and we will excuse you at this time. I know both of you have other things to do.

Let me just go ahead with the introduction of our second panel.

Senator PELL. And I thank you very much for your courtesy and kindness in letting us be here. As you can see, this has a wide reach. My friend and colleague from the House is of a different political party and a different body. We all feel alike in this matter and hope it is taken very seriously.

Senator BINGAMAN. It certainly will be. Thank you both.

Three industry groups have asked to testify on these proposals by the Department of Defense, and we will hear their representatives today.

The first witness will be the Honorable Don Fuqua, who is the president of the Aerospace Industry Association. Before joining the Aerospace Industry Association Don Fuqua served 12 terms as a Congressman from Florida's Second Congressional District. While in Congress he served as chairman of the House Science and Technology Committee, chairman of the Subcommittee on Space, Science and Applications, and as the ranking member of the House Committee on Government Operations.

The second witness is Mr. Bob DeHaven, president and chief executive officer of Quality Systems, Inc., and he is representing the American Electronics Association. In a business career spanning 20 years, Mr. DeHaven has established his own business, managed re-

search and development projects and has written extensively on defense acquisition and related subjects.

Mr. Earle C. Williams is our third witness. He is president and chief executive officer of BDM International, Inc., which is a company owned by Ford Aerospace. Mr. Williams is representing the Professional Services Council and is a professional engineer by training. He previously provided a very valuable service to this subcommittee by serving on the industry advisory group that we had here in 1987.

We will hear from all three witnesses and then put some questions to the entire panel. I see Alan Chvotkin is also present. We appreciate his presence at the witness table. He is well known to this committee and served us very well in his time here on the Hill.

Why don't we go ahead with Don Fuqua first, and then Mr. DeHaven and Mr. Williams for whatever testimony you have. Thank you all for being here.

## STATEMENT OF DON FUQUA, PRESIDENT AND GENERAL MANAGER, AEROSPACE INDUSTRIES ASSOCIATION; ACCOMPANIED BY ALAN CHVOTKIN, ATTORNEY, SUNDSTRAND CORPORATION

Mr. FUQUA. Thank you very much, Mr. Chairman.

I am very pleased to be here today to present our members' views of the Aerospace Industries Association on S. 2440, the Defense Management Improvement Act of 1990.

AIA represents approximately 50 of the Nation's aerospace manufacturing businesses—military and business aircraft, helicopters, aircraft engines, missiles, spacecraft and related components and equipment. And as you mentioned, accompanying me here today is Mr. Alan Chvotkin, the Senior Corporate Attorney for the Sundstrand Corporation.

Also, Mr. Chairman, I would like permission to submit a more detailed statement, and I will try to summarize that statement.

Senator BINGAMAN. We will include everyone's full statement in the record and whatever attachments you would like to submit and also, of course including, the statements of the two previous witnesses.

Mr. FUQUA. The AIA member companies have a long and proud tradition of working with the Department of Defense to meet our national security needs, and as we all know, these needs are in a great state of flux in response to recent world events. The challenge facing both industry and DOD in this new climate is to maintain readiness and surge capability for national defense at a time of drastic reductions in the defense budget.

A partial answer, Mr. Chairman, to the challenge lies in increasing the efficiency and effectiveness of the defense acquisition process. Merely reducing lines of regulations or pages or contracts is not enough. It is with that goal in mind that the defense management review was initiated. Unfortunately, as evidenced by many reform proposals that litter the road of acquisition reform, this is not an easy task.

The DMR effort may succeed where others have failed, because an important by-product has been increased cooperation and inter-

action between DOD and industry. Since President Bush announced the DMR, AIA has been working diligently with DOD to identify regulations in procedures that detract from the goal of efficiency in procurement. We have not always agreed with the approach chosen by DOD, but we cannot dispute the importance of the mutual objective.

The Defense Management Improvement Act is an important component of the DMR. The legislative proposal made by DOD could provide the innovative alternatives necessary to begin streamlining the defense acquisition system and make it responsive to the new national security and fiscal environment. Section 217 of the pilot program for major defense acquisition programs, perhaps more than any other provision in S. 2440, offers that potential.

Understandably, the subcommittee has raised legitimate questions of DOD witnesses and others about the parameters of this proposal, for example, what programs will be selected and what laws will be waived. To date, we at AIA have not had extensive discussions with DOD senior leadership about this proposal. Yet we believe that the use of pilot programs has merit. However, we recommend that the legislation stipulate that the waiver of any provision of law or any regulation which affects any provision of the contract is authorized only with the mutual consent of the contractor and the Government.

Furthermore, such pilot programs should permit the flexibility to test special contracting approaches for research and development programs where production is not anticipated. The pilot program can work if the Department and industry participate in the selection of programs and their design.

Section 217 should clearly not be designed as a test of commercial product procurement. That would cause considerable confusion and uncertainty and adversely affect the advancement of policies for commercial product preference and associated acquisition reform. The acquisition of commercial products should be dealt with exclusively in your review of section 202, which I will discuss a little bit later.

If properly implemented, section 217 could (1) permit greater flexibility in the acquisition decisionmaking, (2) encourage innovative problem solving, (3) accelerate the pace of the acquisition process, and (4) restore a degree of trust between the industry supplier and the Government customer. We believe pilot program alternatives can and should be developed that will satisfy congressional oversight prerogatives, grant the flexibility that DOD seeks, and create a more functional acquisition system without jeopardizing the taxpayers' interest.

We would be pleased to work with DOD and Congress to insure that section 217 authority is properly framed to meet those needs.

Industry supports section 201, which modifies current requirements for multi-year contracting authority. Multi-year procurements of major systems and subsystems have been successful. According to DOD, from 1982 through 1988 Congress approved 58 multi-year requests with savings estimated at approximately $9 billion compared to the annual procurement. To the extent that other factors support the multi-year request, an arbitrary threshold for

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cost saving should not be the barrier to congressional review of otherwise valid candidates.

For many years, industry has provided extensive input to the Office of Federal Procurement Policy, the Office of Information and Regulatory Affairs in the Department of Defense, the General Services Administration and the Congress regarding impediments to the acquisition of commercial products. I have enumerated several of these impediments in my longer statement. If a product is sold legitimately in the commercial marketplace, additional government contractual provisions are inappropriate.

Section 202 deals with various policy concerns long expressed by executive agencies but does not address impediments identified by industry. The acquisition of commercial products by DOD can best be improved by the full and prompt regulatory implementation of section 824 of the fiscal year 1990 Defense Authorization Act, and the enactment of a companion statute to deal with civilian agencies as proposed by Senators Levin, Glenn, Cohen, and Roth in S. 1957, the Nondevelopmental Acquisitions Act of 1989.

Our industry fully supports section 203, which provides for the rescission of both the legislative and the regulatory requirements for the obtaining of commercial pricing certificates. Since the Department recognizes that this information should not be collected based on the statutory requirement, we should urge Congress to specifically deny authority for the executive branch to write regulations requiring the submission of commercial pricing certificates to the Government, except as may be necessary to support the request for exemptions from cost or pricing data within the Truth in Negotiations Act.

In section 204, DOD has proposed certain changes to the Competition in Contracting Act to broaden the Department's flexibility to award negotiated contracts without discussion. The DOD's rationale for this change is predicated on the belief that certain General Accounting Office cases have interpreted law to require award to the lowest priced offeror, and then award without discussion. In our view, DOD's interpretation of the GAO decisions is unnecessarily restrictive.

We believe GAO's interpretation of the Competition in Contracting Act should permit consideration of all cost-related factors listed in a solicitation in determining the lowest overall cost and also permit consideration of other mandatory noncost requirements. In our opinion, the GAO decisions do not require award to the lowest-priced offer. We do not support section 204 in its current form.

I might point out, Senator, that Congressman Mavroules has proposed language on this subject, which, if legislation is deemed necessary, comes closer to meeting industry's concerns.

We strongly support raising the threshold for mandatory submission of cost or pricing data to a minimum of $500,000, as proposed by section 208. This increased threshold would likely enhance the participation of commercial companies and small- and medium-sized contractors in the Department of Defense marketplace. It would also likely facilitate the adoption of commercial buying practices by the DOD. Raising the threshold would also be consistent with the General Accounting standards threshold which was raised to $500,000 in 1988.

In addition to discussing the specific provisions of S. 2440, I would like to highlight other relevant issues to the subcommittee.

Central to the success and design and execution of any program is a clear understanding of the Government's need and a contractor's abilities. We have commented frequently on the need for a uniform DOD policy on release of acquisition information that has as its principal focus the release of a maximum amount of information to contractors. Congress recognized this need last year when it mandated that DOD develop a uniform regulation on release of acquisition information. Both industry and Congress are familiar with the proposed DOD regulation implementing the law.

Industry has significant reservations about the substance of that proposal and its "comprehensive" nature. We hope the Department incorporates industry's suggested improvements before issuing a final regulation. And we would like to urge, Mr. Chairman, that the subcommittee maintain an active oversight role in this process.

It is also, Mr. Chairman, our understanding that a new proposal encompassing an item of great mutual interest to the Congress and industry—procurement integrity—may soon be released by the executive branch. Since we have not seen the proposal, we would be happy to provide you with our comments and meet with interested staff to discuss our reaction, once that document becomes available.

Despite the rumored existence of this proposal, there is a matter of greater urgency with respect to procurement integrity. When the Congress voted to postpone the effectiveness of the section 27 of the Office of Federal Procurement Policy Act reauthorization, it did not rescind the requirement to issue regulations implementing both the law and the amendments contained in the fiscal year 1990 Defense Authorization.

Mr. Chairman, the clock is ticking, and industry wants to know what the ground rules will be when procurement integrity regains full force and effect on December 1 of this year, which is not too far off, and to comply with the need to implement the changes required by the new regulations.

Mr. Chairman, that concludes my statement. I will be happy, at the appropriate time, to answer any questions that you might have.

[The prepared statement of Mr. Fuqua follows:]

TESTIMONY OF DON FUQUA
PRESIDENT
AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC.

Mr. Chairman and Members of the Subcommittee:

I am Don Fuqua, president of the Aerospace Industries Association of America, Inc. (AIA), and am pleased to be here today to present our members' views on S. 2440, "The Defense Management Improvement Act of 1990." AIA represents approximately 50 of the nation's major manufacturers of commercial, military and business aircraft, helicopters, aircraft engines, missiles, spacecraft and related components and equipment.

Background

AIA member companies have a long and proud tradition of working with the Department of Defense (DoD) to meet our national security needs. As we all know, these needs are in a great state of flux in response to recent world events. The challenge facing both industry and DoD in this new climate is to maintain readiness and surge capability for national defense at a time of drastic reductions the defense budget. A partial answer to the challenge lies in increasing the efficiency and effectiveness of the defense acquisition process. Merely reducing lines of regulations or pages of contracts is not enough. It was with that goal in mind that the Defense Management Review (DMR) was initiated. Unfortunately, as evidenced by the many "reform" proposals that litter the road of acquisition reform, this is not an easy task.

The DMR effort may succeed where others have failed because an important byproduct has been increased cooperation and interaction between DoD and industry. Since President Bush announced the DMR, AIA has been working diligently with DoD to identify regulations and procedures that detract from the goal of efficiency in procurement. We have not always agreed with the approach chosen by DoD, but we cannot dispute the importance of the mutual objective.

Defense Management Improvement Act

The Defense Management Improvement Act is an important component of the DMR. The legislative proposals made by DoD could provide the innovative alternatives necessary to begin streamlining the defense acquisition system and make it responsive to the new national security and fiscal environment.

Pilot Programs

Section 217, the "Pilot Program for Major Defense Acquisition Programs" perhaps more than any other provision in S. 2440 offers that potential.

Understandably this subcommittee has raised legitimate questions of DoD witnesses and others about the parameters of this proposal, e.g., what programs will be selected and what laws will be waived. To date, we at AIA have not had extensive discussions with DoD's senior leadership about this proposal. Yet, we believe the use of pilot programs has merit. However, we recommend that the legislation stipulate that the waiver of any provision of law or of regulation which affects any provision of the contract is authorized only with the mutual consent of a contractor and the government. Furthermore, such pilot programs should permit the flexibility to test special contracting approaches for

research and development programs where production is not anticipated. The pilot program can work if the Department and industry participate in the selection of programs and in their design.

Section 217 should clearly not be designed as a test of commercial product procurement. That would cause considerable confusion and uncertainty, adversely affecting the advancement of policies for commercial product preference and associated acquisition reform. The acquisition of commercial products should be dealt with exclusively in your review of Section 202, which I will discuss a little later.

If properly implemented, section 217 could: 1) permit greater flexibility in acquisition decisionmaking; 2) encourage innovative problem solving; 3) accelerate the pace of the acquisition process; and 4) restore a degree of trust between the industry supplier and the government customer. We believe pilot program alternatives can and should be developed that will satisfy Congressional oversight prerogatives, grant the flexibility that DoD seeks, and create a more functional acquisition system without jeopardizing the taxpayer's interest. We would be pleased to work with the DoD and the Congress to ensure that section 217 authority is properly framed to meet these ends.

Multiyear Contracting

Industry supports section 201 which modifies current requirements for multiyear contracting authority. Multiyear procurements of major systems and subsystems have proven successful. According to DoD, from 1982 through 1988, Congress approved 58 multiyear requests, with savings estimated at $9 billion compared to annual procurement. To the extent that other factors support the multiyear request, an arbitrary threshold for cost savings should not be a barrier to Congressional review of otherwise valid candidates.

Even with the elimination of these thresholds, Congress must still affirmatively approve each request for multiyear contracting. Section 201 does not amend the requirement for express Congressional approval before the initiation of the procurement action leading to award of a multiyear contract.

Commercial Products Acquisition

For many years industry has provided extensive input to the Office of Federal Procurement Policy, the Office of Information and Regulatory Affairs, the Department of Defense, the General Services Administration, and the Congress regarding impediments to the acquisition of commercial products. Those impediments primarily concern: 1) excessive and unnecessary cost or pricing data, and price and sales data disclosures; 2) technical data rights requirements; 3) flowdown of government terms and conditions to commercial subcontractors and suppliers; 4) interference with established material and components arrangements; 5) interference with established manufacturing operations; 6) uncertainty caused by continually changing regulations; and 7) ever growing numbers of certifications. If a product is sold legitimately in the commercial marketplace, additional government contractual provisions are inappropriate.

Section 202 deals with various policy concerns long expressed by executive agencies, but it does not address the impediments identified by industry. The acquisition of commercial products by DoD can best be improved by the full and prompt regulatory implementation of Section 824 of the fiscal year 1990 Defense Authorization Act, and enactment of a companion statute to deal with civilian agencies, as proposed by Senators

Levin, Glenn, Cohen, and Roth in S. 1957, the "Nondevelopmental Items Acquisition Act of 1989". Such a statute could also be modified to take further steps toward correcting the serious paperwork and disclosure burdens being imposed on the sale of commercial products, including the problem of requirements for submission of cost or pricing data where competition or the availability of relevant sales data makes such disclosures inappropriate. Industry would support a proposal which included: 1) development of a standard form commercial contract; 2) an increased use of functional requirements rather than design specifications; and 3) an emphasis on the government's use of market research over burdensome and intrusive data disclosure requirements imposed upon commercial products suppliers.

Such a unified approach, providing the best elements of S. 1957 and the concepts discussed above, would better address the true impediments to commercial product acquisition. We strongly recommend it as the preferred approach.

Industry fully supports section 203 which provides for the rescission of both the legislative and regulatory requirements for the obtaining of commercial pricing certificates. These requirements are extremely costly and paperwork intensive. In addition, the government's interests are protected under other laws including the False Claims Act, Program Fraud and Civil Remedies Act, and the Major Fraud Act. Since the Department recognizes that this information should not be collected based on a statutory requirement, we would urge Congress to specifically deny authority for the executive branch to write regulations requiring the submission of commercial pricing certificates to the government, except as may be necessary to support the request for exemption from cost or pricing data within the Truth in Negotiations Act (TINA).

Award Without Discussion

In section 204, DoD has proposed certain changes to the Competition in Contracting Act (CICA) to broaden the Department's flexibility to award negotiated contracts without discussion. The DoD's rationale for this change is predicated on their belief that certain General Accounting Office (GAO) cases have interpreted the law to require award to the lowest priced offeror when award is made without discussion. In our view, DoD's interpretation of the GAO decisions is unnecessarily restrictive.

We believe GAO's interpretation of CICA would permit consideration of all cost-related factors listed in a solicitation in determining lowest overall cost (and also permit consideration of other mandatory non-cost requirements). In our opinion, the GAO decisions do not require award to the lowest priced offeror.

Fundamentally, however, DoD's proposal makes no provision for identifying the relative importance of source selection criteria. Evaluation criteria and their relative weights or range of weights should be identified in procurements whether award is made with or without discussions. The absence of this information permits award decisions to be entirely subjective, which we believe has a negative impact on the stability and effectiveness of the acquisition system. For these reasons we do not support section 204 in its current form. Congressman Mavroules has proposed language on this subject which, if legislation is deemed necessary, comes closer to meeting industry's concerns.

Uniform Thresholds

We strongly support section 205 of the bill which provides a uniform

threshold for application of small purchase procedures. Small purchases account for virtually all of the Federal government's contract actions but only a very small percentage of appropriated dollars.

Many of the dollar thresholds for application of individual procurement provisions were established at the amount then in effect for small purchases. By deleting the specific dollar amounts in each case, and replacing them with a reference to a uniform "small purchase threshold," we can achieve the dual purposes of (1) applying these provisions only to large purchases, where the cost of implementation and oversight can be justified and (2) simplifying future implementation and administration of the dollar level of the threshold.

Dual Sourcing

Current law (10 U.S.C. 2438) contains a preference for dual sourcing and requires detailed justifications where dual sourcing is not considered appropriate. Section 207 would amend the statute to state that dual sourcing is mandatory when it would likely result in reduced costs, would not result in unacceptable delays, and would otherwise serve national security interests. We support the amendment. The change would retain a preference for dual sourcing when it is cost effective, but would provide the Secretary of Defense with needed flexibility in reaching an appropriate decision on the method of procurement.

Cost or Pricing Data

We strongly support raising the threshold for mandatory submission of cost or pricing data to a minimum of $500,000 as proposed by section 208. This increased threshold would likely enhance the participation of commercial companies and small and medium-sized contractors in the Department of Defense marketplace. It would also likely facilitate the adoption of commercial buying practices by the DoD. Raising the threshold would be consistent with the Cost Accounting Standards threshold, raised to $500,000 in 1988.

The low threshold imposes an enormous paperwork burden on contractors. Had the $500,000 threshold been in effect in 1988, the number of contract actions covered would have been reduced from 43,768 to 15,375. Yet there only would have been a 7.5% reduction in dollars covered.

Contrary to perceptions held by some officials that a higher threshold will shield a significant number of contracts from government audits and recovery of excess costs, raising the threshold does not preclude the government from asking for cost or pricing information when appropriate. Consequently, we believe this amendment would improve the operation of the federal acquisition system.

In addition to discussing the specific provisions in S. 2440, I would like to highlight several other relevant issues for the Subcommittee.

Comprehensive Integrity Initiative

On March 21 of this year, AIA and three other defense industry associations sent a letter to Dr. Allan Burman, administrator of the Office of Federal Procurement Policy (OFPP), stating our concern about the cumulative effect of the uncoordinated approach in recent legislation and implementing regulations designed to improve the integrity of the procurement process. I would like to make a copy of that letter part of the record. You requested that I update the Subcommittee on the results of that communication. I am pleased to inform you that Dr. Burman

responded that his office shared industry's concerns, and suggested a coordinated approach to the problem. Industry and OFPP are currently comparing statutes and regulations to determine where overlaps occur. For example, most regulations require contractors and the government to train people in the details of the law. Standardization of regulations in this area could result in streamlined training methods that would save time, personnel, and money, and may lead to a better understanding of our compliance obligations under these laws.

Defense Advisory Panel on Government-Industry Relations

While I am on the subject of government/industry cooperation, I would like to urge Congress and DoD to take the steps necessary to implement the recommendations contained in the final report of the Defense Advisory Panel on Government-Industry Relations (DAPGIR). This action will be an important step in the improvement of our relationship, and consideration ought to be given to making DAPGIR permanent.

Reports Elimination

Recently, House Armed Services Chairman Les Aspin sponsored a bill eliminating many "unnecessary" reporting requirements currently imposed on the Department of Defense. We generally support that initiative. However, one of the items Chairman Aspin proposes to repeal is the annual update and report to the Congress on the Integrated Financing Plan, a proposal which this Subcommittee initiated only two years ago. Industry believes it is too soon to tell if the Integrated Financing Plan review and reporting requirement should be rescinded. We urge the subcommittee to evaluate this requirement during its consideration of the House bill.

Release of Acquisition Information

Central to success in the design and execution of any program is a clear understanding of the government's needs and a contractor's abilities. We have commented frequently on the need for a uniform DoD policy on release of acquisition information that has as its principal focus the release of a maximum amount of information to contractors. Congress recognized this need last year when it mandated that DoD develop a uniform regulation on release of acquisition information. Both industry and Congress are familiar with the proposed DoD regulation implementing that law. Industry has significant reservations about the substance of that proposal and its "comprehensive" nature. We hope the Department incorporates industry's suggested improvements before issuing a final regulation. We urge this Subcommittee to maintain an active oversight role of this process.

Senator BINGAMAN. Thank you very much.
Mr. DeHaven, why don't you go right ahead.

**STATEMENT OF ROBERT C. DeHAVEN, PRESIDENT, QUALITY SYSTEMS, INC., ON BEHALF OF THE AMERICAN ELECTRONICS ASSOCIATION**

Mr. DEHAVEN. Good morning, my name is Robert C. DeHaven, and I am president of Quality Systems, Incorporated, a company based in Fairfax, Virginia, employing 230 computer scientists and engineers.

I am here this morning testifying on behalf of my trade association, the American Electronics Association. The AEA represents a broad segment of the U.S. electronics industry including large, small and mid-sized high technology companies.

While we represent many of the large household names, U.S. electronic companies, over 80 percent of our member companies employ 200 people or less. I appreciate the opportunity to testify before your subcommittee today and will take guidance from the rule of St. Benedict written in the 16th century.

The rule went as follows: Any pilgrim monk, come from distant parts, find fault with anything or expose it reasonably and with humility of charity, the abbot shall discuss it prudently, lest, perchance, God has sent him for this very thing. But, if he have been found gossipy and contemptuous in his time of his sojourner's guest, not only ought he not to be joined to the body of the monastery, but also shall be said to him honestly that he must depart. If he does not go, let two stout monks, in the name of God, explain the matter to him.

I shall attempt to present our position reasonably and with humility of charity.

Senator BINGAMAN. You are probably aware that is not part of the Senate rules. [Laughter.]

Mr. DEHAVEN. I am now.

We have views on a wide variety of provisions in the Defense Department's legislative package that would affect our 3,500 corporate members, particularly those that deal with commercial acquisition issues, such as sections 202, 203 and 204.

We strongly support section 201 on multi-year contracting. But now I would like to focus on one specific provision that affects a large percentage of our membership. No issue is more clear-cut and straightforward than section 208, which deals with cost or pricing data. Many of the provisions in the DMIA are controversial and would require extensive legislative language as well as substantially modifying or waiving statutes. But section 208 would simply change one number, $100,000, to another, $500,000, in the Truth in Negotiations Act.

The major beneficiary of this action would be the U.S. taxpayer, because the proposed change reduces the cost of doing business with the Government. This change would simply reflect the inflation rate, since the $100,000 threshold was set in 1962. Factoring in inflation since 1962, that $100,000 would, conservatively speaking, be equivalent to $470,000 today.

We would also like to see the new $500,000 threshold indexed for inflation. Cost or pricing data is all of the information that has any bearing on how a product is priced. This includes all elements of cost, which comprise the overhead rates, the general administrative rates, supplies, equipment and so forth. The burdens and requirements for certifying the accuracy and completeness of this information go beyond the normal commercial practices in a number of respects.

The certification of cost or pricing data and that it is current, accurate and complete could lead to both civil and criminal penalty risk on the part of employee and possible debarment or suspension for the company.

In addition, there are major costs associated with creating, maintaining and exercising the systems to track the volumes of data that are necessary to meet the requirements of the certification. These are serious disincentives for small companies, small disad-

vantaged companies, and commercial companies that might be thinking about doing business with the Government.

Who should care about this issue? The Defense Contract Audit Agency cares. DCAA supports raising the threshold to $500,000 on the grounds of inflation to bring it into line with the threshold for obtaining field pricing support. Because of the minuscule marginal returns to scale of auditing contracts in this range, DCAA audits only .6 percent of these contracts. I would like to submit the DCAA position paper to you for the record.

[The information follows:]

DEFENSE CONTRACT AUDIT AGENCY

Statistics on Post Award Reviews Conducted
on Contracts Under $500,000

| | 1987 | 1988 | 1989 |
|---|---|---|---|
| Number of Audits Performed | 139 | 115 | 157 |
| Cost of DCAA Audits | $326.3K | $339.6K | $459.1K |
| Total Value of Contracts Examined | $32,745K | $22,964K | $32,992K |
| Total Recommended Price Adjustments | $3,957K | $3,208K | $3,850K |
| Percentage of Recommended Price Adj. | 12.1% | 14.0% | 11.7% |

We support the legislative proposal to raise the threshold for application of the Truth in Negotiations Act (TINA) from $100,000 to $500,000 for the following reasons:

First, Congress established the initial threshold for TINA in 1962 at $100,000. This is the level that Congress considered appropriate at that time considering the materiality and risk associated with those contracts that would not be covered. This initial threshold, when adjusted for inflation, translates to approximately $500,000 in today's dollars. Therefore, a $500,000 threshold today would be consistent with the initial intent of Congress when the threshold was first established.

Secondly, the regulatory threshold for obtaining field pricing support, including audit reports, is $500,000. Raising the TINA threshold to $500,000 would make it consistent with this regulatory threshold.

Finally, we perform very few post award reviews of contracts below $500,000. This minimal level of audit activity, when viewed in relation to the effort and cost associated with contractors generating cost or pricing data would, from an audit standpoint, support an increase in the current threshold.

Who else cares? Different sizes and types of companies care for different reasons. Most of the big defense contractors do not do much business below $500,000 and have made a major investment to streamline as much as possible the collection of this data. The big companies care, however, because they must collect, verify and maintain these reports for their subcontractors. Furthermore, the low threshold serves as a major disincentive for small businesses, small disadvantaged businesses and commercial companies seeking subcontracts.

Large primes want to subcontract with commercial and smaller firms for the following reasons. One, the firm may be source of unique technology or capability. Small businesses are still a major source of innovation in this country. Second, small firms have lower overhead rates and can help reduce the total cost of an effort to the Government, thus making the prime more competitive. And third, primes have small, and small disadvantaged subcontracting goals which must be met.

Commercial high tech companies who do not do much government business and small emerging growth companies are most negatively affected by the low threshold. Faced with current requirements and potential penalties, these companies often avoid the risk of doing business with the Government or prime contractors. The American taxpayer and their representatives should care about this. Without commercial and small company participation, we are being deprived of the best innovative technology, and we are paying too much for what we get.

Furthermore, the low threshold has a negative impact on the U.S. industrial base. A Blue Ribbon Commission established by the Center for Strategic and International Studies believes that the low threshold creates a major obstacle to our industrial base and companies' efforts to better integrate defense and commercial technologies. After all, it is the broad industrial base, not just the narrow defense industrial base, that is the key to preserving our defenses during this new era beyond the Cold War.

Why should the threshold be raised? First of all, *inflation.* As I said, factoring inflation from 1962 at $100,000 is equivalent to $470,000 today. Second, the *paper work burden.* The low threshold imposes an enormous paper work burden on contractors. Had the $500,000 threshold been in effect in 1988, the number of contract actions covered would have been reduced from 43,768 to 15,375, not counting the subcontracts. Yet there would have only have been a 7.5 percent reduction in the dollars covered.

A recent report to Congress from the Office of Federal Procurement Policy entitled Federal Procurement Paper Work Burden, noted that: "The expense of compiling cost or pricing data at the level of detail in accordance with government cost accounting standards can be substantial. Certification of data requires contractors to exercise a high degree of care and often requires them to employ special legalized and accounting assistance thereby increasing cost."

Every single major study of the defense business, including the Packard Commission in this administration's defense management review, has concluded that government should scale back its excessive paper work requirements.

The third reason is the *industrial base.* Raising the threshold would help to eliminate one of the major disincentives to small companies and commercial companies entering the Government marketplace. Most of the contracts these companies would pursue are under $500,000. As it now stands, the cost and risk associated with meeting this certified cost or pricing data requirement are major considerations for these companies. These costs are not often fully recoverable to the commercial firms. Raising the threshold

would tend to benefit the objectives of the Competition in Contracting Act by encouraging more bidders to participate.

Raising the threshold would save the Government money by reducing the procurement lead times of all affected purchases. It usually takes 60 days to 90 days to obtain and review cost or pricing data. Relief from this requirement would free staff to attend to other tasks and speed the award of contracts, thus reducing staff cost and government inventory needs due to the shorter procurement process.

Fourth is just simple *cost and benefit.* Estimates of cost of meeting the low threshold requirement varied by company. There is the initial up-front cost of putting such systems in place, then the cost for preparation of each certification. Once this system is in place, it is estimated that the preparation costs range from $1,000 to $5,000 per proposal.

Multiply that cost times the number of contract actions in the range, which was about 30,000 in 1988, and by an additional factor for subcontract actions—and we do not know exactly what that is, but we estimate it to be somewhere between two and three times that 30,000 figure—the resulting total of this requirement is enormous when compared to the dollars recovered by DCAA on mispricing within the category.

Without doubt the real money is in the cost of preparation, costs that are passed back to the Government and taxpayer in terms of higher overhead rates and are somehow supposed to be absorbed by commercial contractors.

While DCAA supports raising the threshold, the Defense Department Inspector General's Office remains opposed. We have some major disagreement with the IG's rationale for taking this position. I would like to ask you to include a point-by-point response to the IG's position that we have prepared for the record.

[The insert is attached to the submitted written statement.]

Let me spend a minute pointing out our disagreement with two of the most significant assertions made by the IG.

First, the IG is relying upon faulty and misleading statistics. The IG cites a 1987 study of 20 contracts in the $100,000 to $500,000 range.

Senator BINGAMAN. Do you have a copy of that in what you have provided us so far? A copy of that sheet that you are reading from now, going through and responding to the IG?

Mr. DEHAVEN. Yes, sir.

Senator BINGAMAN. Go ahead with your testimony. I just had not seen that.

Mr. DEHAVEN. The IG cites a 1987 study of 20 contracts in the $100,000 to $500,000 range. The IG concluded that half of those contracts were overpriced. Such a small sample is statistically invalid. The overall annual number of prime contracts in the range is over 30,000, with subcontracts multiplying the total number by a factor of two or three. Even a random sample of 20 contracts out of such a large, diverse population would tell us nothing statistically.

Furthermore, as indicated in his oral testimony before the Senate, Assistant Inspector General Lieberman conceded that the contracts examined were not randomly selected but were selected based on indications that problems were clearly present. We find it

surprising that only half of the contracts were overpriced considering how they were selected. In addition, the IG suggests that overpricing as a percent of contract value is higher in the $100,000 to $500,000 range than it is in other categories.

The real dollars associated with the alleged overpricing in this contract range is very small compared to the other ranges. Because the dollars in the $100,000 to $500,000 range are so small, every dollar that is overpriced is, of course, a much higher percentage of the total contract value.

Second, the IG contends there is no administrative burden associated with this. The IG's office has said that if it could be demonstrated that there were a real administrative burden, then it would reconsider its position. Well, time has come for the IG to reconsider its position. There is a real administrative burden associated with certifying that the cost or pricing data is current, accurate and complete.

As has been discussed above, this goes well beyond what is done in the commercial marketplaces. Companies must revise, check, recheck and do sweeps to feel somewhat comfortable certifying this data. They must also do extensive training. After all, the penalties are harsh for any mistakes. In addition, it has been indicated above, there are indeed real costs associated with providing cost and pricing data at the low $100,000 threshold, as the Office of Federal Procurement Policy report indicates.

We have also asked several of the Big Eight accounting firms that routinely audit government contractors to try to get our association some information on this, and when that comes, I will be glad to share that with you, too.

We could not disagree more strongly with the IG on these two points.

SAFETY NET

At the $500,000 threshold the ability to deter mispricing would continue to be present. First, in my experience, it is competition, not a certification, that gets the Government the best deal. When the Government buys best value and takes past performance into consideration, the taxpayer gets the best deal. In addition, a myriad of other laws and regulations that are on the books will continue to act as deterrents if needed.

Furthermore, contracting officers can request cost or pricing data below the 28-year-old $100,000 threshold today through the FAR. This would be true for the $500,000 threshold as well. Let me read to you a section of the Federal Acquisition Regulation that makes this clear.

"If certified cost or pricing data are needed for pricing actions over $25,000 and not in excess of $100,000, they may be obtained. There should be relatively few instances where certified cost or pricing data and inclusion of defective pricing clauses would be justified in awards between $25,000 and $100,000. The data which the contracting officer requires to be submitted shall be limited to that data necessary to determine the reasonableness of the price. Whenever certified cost or pricing data are required for pricing actions of

$100,000 or less, the contracting officer shall document the file to justify the requirement."

In conclusion, we believe that raising the threshold to a minimum of $500,000 will bring many benefits to the Federal Government, will strengthen the industrial base and provide savings to the taxpayer. As well as being a bottom line issue for companies, this is also a symbolic one. Raising the threshold is simple and straightforward. If this cannot be changed, contractors believe that the growing layers of statutes and regulations will continue unabated. Such a trend has serious long-term implications for the health of the U.S. industrial base.

If this threshold, this one number change to account for inflation, can be changed, it will demonstrate that Congress and the Government does not always impose more and more paperwork and liability on industry. It will demonstrate that government, industry, and Congress can start moving away from the adversarial relationship that exists today.

We are hopeful. The Defense Department has done its part in recommending that Congress make the change. Now, it is up to you.

Thank you. And I will be happy to answer any of your questions.

[The prepared statement of Mr. DeHaven follows:]

Testimony by Robert C. DeHaven
On Behalf of the American Electronics Association

Good morning. My name is Robert C. DeHaven, and I am the President of Quality Systems Incorporated (QSI), a company based in Fairfax, Virginia, employing 230 computer scientists and engineers.

I am here this morning testifying on behalf of my trade association, the American Electronics Association (AEA). The AEA represents a broad segment of the U.S. electronics industry, including large, small and mid-sized high technology companies. The industry segments we represent cover defense, software, computer systems, semiconductor, systems integrators as well as others. While we represent many of the large "household name" U.S. electronics companies, over 80% of our member companies employ 200 people or less. About 40% of our companies do at least a small percentage of their business with the federal government.

We have views on a wide variety of provisions in the Defense Department's legislative package that would affect our 3500 corporate members, particularly those that deal with commercial acquisition issues such as Sections 202, 203 and 204. We strongly support Section 201 on Multi-Year Contracting. I would be happy to go into more specifics on these issues during the question and answer period.

But now, I would like to focus on one specific provision that affects a large percentage of our membership. No issue is more clear-cut and straight-forward than Section 208 of the Defense Management Improvement Act, "Cost or Pricing Data."

Many of the provisions in the DMIA are controversial and would require extensive legislative language, as well as substantially modifying and waiving statutes -- laws created by Congress -- laws to which Congress has devoted much time and consideration. But Section 208 would simply change one number, $100,000 to another, $500,000. The place that this number would be changed is in the Truth in Negotiations Act (TINA). This new number would not give any new "breaks" to defense contractors. In fact, the major beneficiary would be the U.S. Government, because this change reduces the cost of doing business with the government. The proposed change would do one thing and one thing only: reflect the inflation rate since the $100,000 threshold was set in 1962. Factoring in inflation since 1962, that $100,000 would conservatively speaking be equivalent to $470,000 today. We would also like to see the new $500,000 threshold indexed for inflation.

<u>What is this cost or pricing data threshold?</u> Cost or pricing data is all the information that has any bearing on how a product is priced. This includes all elements of cost which comprise the overhead rates, the general and administrative rates, supplies, equipment...etc. The burdens and requirements for certifying

the accuracy and completeness of this information go beyond normal commercial practices in a number of respects. The certification of cost or pricing data -- and that it is current, accurate and complete -- could lead to both a civil and criminal penalty risk on the part of the employee, and possible debarment or suspension for the company. In addition, there are major costs associated with creating, maintaining and exercising the systems to track the volumes of data that are necessary to meet the requirements of the certification. These are serious disincentives for small companies and commercial companies that might be thinking about doing business with the government.

A company's proposal team requires continuous updates from various interrelated and dispersed sources to maintain the most current information. Any changes in the project's internal architecture, design or configuration could have an effect on the cost or pricing data information, as could changes in producibility, process or tooling improvements. Some of these considerations force judgement calls by the contractor. To certify this data, companies have created elaborate systems to track, collect and cross-reference all this material.

Who should care about this issue? The Defense Contract Audit Agency cares. DCAA supports raising the threshold to $500,000 on the grounds of inflation, to bring it into line with the threshold for obtaining field pricing support, (the minimum level of post award reviews in this range and the costs

associated with generating cost or pricing data). Because of the miniscule marginal returns to scale of auditing contracts in this range, DCAA audits only one-sixth of 1% of these contracts. I would like to submit the DCAA position paper to you for the record.

Who else cares? Different sizes and types of companies care for different reasons. Most of the big defense contractors don't do much business below $500,000 and have made the major investments to streamline as much as possible the collection of all this data. The big companies care, however, because they must collect, verify and maintain these reports for their subcontractors. Furthermore, the low threshold serves as a major disincentive for small businesses, small disadvantaged businesses and commercial companies seeking subcontracts. Large primes want to subcontract with commercial and smaller firms for the following reasons:

1. The firm may be a source of a unique technology or capability. Small businesses are still a major source of innovation in our country.

2. Small firms have lower overhead rates and can help reduce the total cost of an effort to the government, thus making the prime more competitive.

3. Primes have small and small disadvantaged business

subcontracting goals which must be met.

Commercial, high-tech companies who don't do much government business, and small emerging growth companies are most negatively affected by the low threshold. Faced with current requirements and potential penalties, these companies often avoid the risks of doing business with the government or prime contractors. The American taxpayer and their representatives should care about this. Without commercial and small company participation, we are being deprived of the best innovative technology, and we are paying too much for what we get. Furthermore, the low threshold has a negative impact on the health of the broad U.S. industrial base. A blue-ribbon commission established by the Center for Strategic and International Studies believes that the low threshold creates a major obstacle to our industrial base and companies' efforts to better integrate defense and commercial technologies. After all, it is a broad industrial base -- not just a narrow defense industrial base -- that is the key to preserving our defenses during this new era beyond the Cold War.

Why should the threshold be raised?

1. Inflation

Factoring in inflation, the $100,000 threshold should be set at about $470,000 today.

2. Paperwork Burden

The low threshold imposes an enormous paperwork burden on contractors. Had the $500,000 threshold been in effect in 1988, the number of contract actions covered would have been reduced from 43,768 to 15,375 (this does not include subcontracts). Yet there only would have been a 7.5% reduction in dollars covered.

A recent report to Congress from the Office of Federal Procurement Policy entitled "Federal Procurement Paperwork Burden" noted that, "The expense of compiling cost or pricing data at the level of detail and in accordance with government cost accounting standards can be substantial. Certification of data requires contractors to exercise a high degree of care...and often requires them to employ specialized legal and accounting assistance, thereby further increasing costs."

Every single major study of the defense business (including the Packard Commission and this Administration's Defense Management Review) has concluded that government should scale back its excessive paperwork requirements.

3. Industrial Base

Raising the threshold would help to eliminate one of the major disincentives to small companies and commercial companies entering the government marketplace as

subcontractors and suppliers to some of the major contractors. Most of the contracts these companies would pursue are under $500,000. As it now stands, the costs and risks associated with meeting the certified cost or pricing data requirement are major considerations for these companies. These costs are often not fully recoverable to commercial firms. Raising the threshold would tend to benefit the objectives of the Competition in Contracting Act by encouraging more bidders to participate.

Raising the threshold would save the government money by reducing the procurement lead times of all affected purchases. It usually takes 60 to 90 days to obtain and review cost or pricing data. Relief from this requirement would free staff to attend to other tasks and speed the award of contracts, thus reducing staff cost and government inventory needs due to a shorter procurement process.

4. Cost/Benefit Analysis

Currently, the Defense Contract Audit Agency (DCAA) reviews six-tenths of one percent of contracts in the $100,000 to $500,000 range. Estimates of the cost of meeting the low threshold requirement vary by company. There is the initial, up-front cost of putting such systems in place, and then the cost for the preparation of each certification. Once the system is in place, it is estimated that preparation costs range from $1,000 to $5,000 per proposal. Multiply that cost times the number of contract actions in the range (about 30,000 in 1988) and by an additional factor of subcontract actions (unknown, but more

than two to three times the 30,000 figure): the resulting total of this requirement is enormous when compared to the dollars recovered by DCAA on mispricing within the category. Without doubt, the "real money" is in the cost of preparation -- costs that are passed back on to the government and taxpayer in terms of higher overhead rates and are somehow absorbed by commercial contractors.

The IG Opposes It

While DCAA supports raising the threshold, the Defense Department Inspector General's office remains opposed. We have some major disagreements with the IG's rationale for taking this position. I would like to ask you to include a point-by-point response to the IG's position that we have prepared for the record. Let me spend a minute pointing out our disagreement with two of the most significant assertions made by the IG.

Response to the IG

1. The IG is Relying Upon Faulty and Misleading "Statistics."

The IG cites a 1987 study of 20 contracts in the $100,000 to $500,000 range. The IG concluded that half of the contracts were "overpriced."

Such a small sample is statistically invalid. The overall

annual number of prime contracts in this range is over 30,000, with subcontracts multiplying the total number by a factor of two or three. Evan a random sample of twenty contracts out of such a large diverse population would tell us nothing statistically. Furthermore, as indicated in his oral testimony before the Senate, Assistant Inspector General Lieberman conceded that the contracts examined were not randomly selected, but were selected based on indications that problems were clearly present. I find it surprising that only half of the contracts were overpriced considering how they were selected.

In addition, the IG suggests that "overpricing as a percent of contract value" is higher in the $100,000 to $500,000 range (14%) than the other categories. Again, the faulty -- and small -- sampling makes this figure highly suspect. In addition, the real dollars associated with this alleged "overpricing" in this contract range is very small compared to the other ranges. Because the dollars in the $100,000 to $500,000 range are so small, every dollar that is overpriced is a much higher percentage of contract value.

2. There is No Administrative Burden, According to the IG.

The IG stated that it does not believe that there is any administrative burden associated with the low $100,000 cost or pricing data threshold. In a letter to the Chairman of the House Armed Services Committee, Defense Department Inspector General Susan Crawford wrote that: "In our view, no one has yet demonstrated that the preparation of cost or pricing data,

which must be compiled routinely during the preparation of a proposal package, causes additional workload. In addition, we are not ware of any analyses indicating that the proposed change would be cost beneficial for the government."

The IG's office has also said that if it could be demonstrated that there was a real administrative burden, then it would reconsider its position. Well, the time has come for the IG to reconsider its position. There is a real administrative burden associated with certifying that the cost or pricing data is current, accurate, and complete. As has been discussed above, this goes well beyond what is done in the commercial marketplace. Companies must revise, check, re-check and do "sweeps" to feel somewhat comfortable certifying this data. And they must have systems set-up to crosss-reference all this data. They must also do extensive training. After all, the penalties are harsh for any mistakes. I don't envy the person who must sign their name on the certification on behalf of a company. In addition, as has been indicated above, there are indeed real costs associated with providing cost or pricing data at the low $100,000 threshold (as the Office of Federal Procurement Policy indicates). We could not disagree more strongly with the IG on these two points.

The Safety Net

At the $500,000 threshold, the ability to deter mispricing would continue to be present. First, a myriad of other laws and

regulations that are on the books will continue to act as "deterrence."

Additionally, contracting officers can request cost or pricing data below the 28 year-old $100,000 threshold today through the FAR; this would be true for under $500,000 if the threshold were raised. Let me read to you the section of the Federal Acquisition Regulation that makes this clear:

> "If certified cost or pricing data are needed for pricing actions over $25,000 and not in excess of $100,000, they may be obtained. There should be relatively few instances where certified cost or pricing data and inclusion of defective pricing clauses would be justified in awards between $25,000 and $100,000. The data which the contracting officer requires to be submitted shall be limited to that data necessary to determine the reasonableness of the price. Whenever certified cost or pricing data are required for pricing actions of $100,000 or less, the contracting officer shall document the file to justify the requirement."

That is, the contracting officer can obtain certified cost or pricing data where there is a reason to do so; this would also apply below the proposed $500,000 threshold. The difference is that the certified cost or pricing data -- and all the paperwork and costs and administrative burden that goes along with it -- would not be required on each and every contract. In short, the government would not be "disarmed" in any sense of the word.

Rather, it would not be routine to submit extensive and burdensome certified cost or pricing data on every contract.

Conclusion

In conclusion, we believe that raising the threshold to a minimum of $500,000 will bring many benefits to the federal government, will strengthen the industrial base and provide savings to the taxpayer.

As well as being a bottom-line issue for companies, this is also a symbolic one. Raising the threshold is simple and straightforward. If this can't be changed, contractors believe that the growing layers of statutes and regulations will continue unabated. Such a trend has serious long-term implications for the health of the U.S. industrial base. If this threshold -- this one number change to account for inflation -- can be changed, it will demonstrate that Congress and the government does not always impose more and more paperwork and liability upon the industry. It will demonstrate that government and industry and Congress can start moving away from the adversarial relationship that exists today.

We are hopeful. The Defense Department has done its part in recommending that Congress make the change. Now it is up to you. Thank you, and I would be happy to answer your questions.

RESPONSE TO DOD INSPECTOR GENERAL OPPOSITION TO
RAISING TRUTH IN NEGOTIATION ACT THRESHOLD

Background

In an April 24, 1990 response to an April 17, 1990 letter from Chairman Les Aspin and in testimony before the Senate Armed Services Subcommittee on Industry and Technology, the Office of Inspector General has outlined its position in opposition to raising the Truth in Negotiation Act threshold from $100,000 to $500,000. The following responds to the statements made by the Inspector General in support of that position.

* IG Position

  Raising the Threshold Would Signal Acceptance by the Government of Defective Pricing in Half of the Contract Actions Between $100,000 and $500,000.

* Response

In support of this position the IG first cites a 1987 study of just 20 contracts in the $100,000 to $500,000 range. The IG concluded that half of the contracts were "overpriced."

The statistical validity of such a small sample is questionable when the overall annual universe of prime contracts in this range is between 40,000 and 50,000, with subcontracts multiplying the total number by an order of magnitude. Furthermore, as indicated in his oral testimony before the Senate, Assistant Inspector General Lieberman stated that the contracts examined were not randomly selected, but were selected based on indications that problems were present.

The percentage of overpriced contracts in the $100,000 to $500,000 range is less than that for all but one of the threshold categories listed in the IG letter.

Assistant Inspector General Lieberman further supports the IG's position in his written statement before the Senate by indicating that "[w]e understand that the DCAA continues to encounter defective pricing in that value range with the same frequency." No further statistical evidence of that "understanding" is offered nor is any mention made of the fact that DCAA supports raising the threshold.

[DCAA has publicly supported raising the threshold on the grounds of inflation, bringing the TINA threshold in line with the regulatory threshold for obtaining field pricing support, and the minimal level of audit activity in this range "when viewed in relation to the effort and cost associated with contractors generating cost or pricing data..." DCAA audits six-tenths of one percent of contracts in this range. See attached DCAA position paper.]

The IG argues that since 14% of this questionable sampling constitutes overpricing as a percent of contract value (a higher mpercentage than higher contract ranges) the threshold should remain at the $100,000 level. In fact, exactly the opposite is true: this 14% is higher because the real dollars involved are so small compared to the other threshold levels.

While it is possible that some small number of contractors will always attempt to defraud the government, no credible evidence that the magnitude of the problem is even close to the

50 percent level cited by the IG has been presented. In the specific area of the acquisition of spare parts, one of the problem areas that generated congressional support for lowering the threshold in 1985, the Assistant Inspector General Lieberman pointed out in the portion of his written statement that addresses the commercial pricing certificate that "DoD activities generally were obtaining the lowest price for most commercial spare or repair parts, with or without the [pricing] certificates." It is hard to imagine how overpricing can occur at a 50 percent rate when DoD is receiving the lowest price for spare parts, an area that still generates considerable Truth In Negotiation Act activity in the $100,000 to $500,000 range.

Finally, what somehow gets lost in all this is that the low threshold discourages small and medium-sized companies from entering the federal marketplace. Fewer suppliers hurts the breadth of the U.S. mobilization base and means the Government may not receive the most advantageous contract terms.

* IG Position

No one has yet demonstrated that the preparation of cost or pricing data causes additional work load for either contractors or the government.

* Response

In support of this position, the IG concludes that a contractor must compile cost or pricing data in any case in order to submit a proposal. This conclusion fails to recognize and account for the real burdens and paperwork requirements of the Truth In Negotiation Act requirements.

First, the vast majority of commercial vendors selling commercial products to the government do not compile cost or pricing data as part of the standard proposal preparation process, a fact that the IG seems to have ignored. The data needed to complete a SF 1412, Request for Exemption from Submission of Certified Cost or Pricing Data, is generated by a commercial vendor only because of the requirements of the Truth In Negotiation Act.

Second, for both commercial vendors submitting sales data and for contractors submitting cost or pricing data, a significant portion of the burden is created by the need to have systems that permit the contractor to certify as to the completeness of the data submitted. Judicial and regulatory requirements as to the total amount of data that must be submitted or reviewed in order to assure compliance adds significant costs to proposal preparation. Without incurring those extra costs, a contractor cannot properly certify as to the data submitted.

Third, the DCAA has recognized that significant costs are incurred by contractors with little benefit from an audit standpoint. This point is further supported by the recent Office of Federal Procurement Policy report on "Federal Procurement Paperwork Burden" which concluded that "The expense of compiling cost or pricing data at the level of detail and in accordance with government cost accounting standards can be substantial. Certification of data requires them to employ specialized legal and accounting assistance, thereby further increasing costs."

Fourth, there would be a reduction in procurement lead times of all affected purchases. It usually takes 60 to 90 days to review and obtain cost or pricing data. Relief from this requirement would speed the award of contracts and reduce

government inventory needs due to a shorter pipeline.

The Public Contract Law Section of the American Bar Association in testimony has also recognized the paperwork burden associated with the threshold. Mr. Donald Gavin maintains that "Not only would the $500,000 level be a restoration of a previously established threshold, it would also enhance the 'acquisition streamlining' philosophy that this and other initiatives purport to foster. There simply is no need, contrary to the position of the IG, which would support the financial burden to both the contractor and to the government in reviewing these low level certifications." [The ABA supports raising the threshold on the grounds of the paperwork burden, the disproportionate burden on small business, and duplicative legal remedies -- "There is a myriad of other laws and regulations to cover these situations."]

Finally, the conclusion that there is no federal burden ignores the simple fact that the government is often paying for the collection and submission of cost or pricing data through higher product prices. For commercial suppliers of catalog products who must generate the data necessary to support claims for exemption, these costs must be built into the price of the commercial product. This makes the supplier that much less competitive in the world market.

* IG Position

Industry justifies its support for raising the threshold as a long overdue adjustment for inflation.

* Response

There is no factual doubt that the $100,000 threshold, set in 1962, when adjusted for inflation, would be $467,000 today. Industry's support for a higher threshold, however, goes much beyond that simple and straightforward fact.

One cannot ignore both the policy and reality of a very low threshold. According to data compiled by the American Electronics Association, there are 43,768 contract actions over $100,000 and worth $74.56 billion that are covered by the Truth In Negotiations Act. By raising the threshold to $500,000, there is only a 7.5 percent reduction in actual dollars covered but two-thirds of the contract actions are eliminated and administrative costs are comparably reduced.

As indicated by Assistant Inspector General Lieberman, the Truth In Negotiations Act was enacted in order to place the government on equal footing when negotiating price. Raising the threshold retains that same basis for the vast majority of contract dollars spent. It does not mean that contractors are in a superior position for the remainder of the contract dollars. Pursuant to statute, agencies retain the right to request cost or pricing data whenever they believe it would be in the best interests of the government.

Furthermore, contracting officers have the obligation to perform price analysis for every procurement in order to determine that the offered price is reasonable, regardless of whether or not cost or pricing data was submitted. The tools used in pricing analyses, including government cost estimates, historical pricing, market pricing and comparison, and catalog pricing remain available to the contracting officer. If there is any indication that the offered price is not reasonable, further information can be requested. That level of protection is entirely appropriate for the number of dollars being spent on each acquisition.

Senator BINGAMAN. Thank you very much, Mr. DeHaven.

And, Mr. Williams, why don't you go right ahead with your testimony? I notice Mr. Mark Schultz, president of the Professional Services Council, is also with you. We appreciate having you here today.

**STATEMENT OF EARLE C. WILLIAMS, PRESIDENT AND CHIEF EXECUTIVE OFFICER, BDM INTERNATIONAL, INCORPORATED, ON BEHALF OF THE PROFESSIONAL SERVICES COUNCIL; ACCOMPANIED BY MARK SCHULTZ, PRESIDENT, PROFESSIONAL SERVICES COUNCIL**

Mr. WILLIAMS. Senator, my understanding is that my prepared statement will be included in the record as submitted. The statement is rather lengthy, and I understand you are all working against a deadline today. With your permission, I would now like to present my views orally, rather than read my statement.

Senator BINGAMAN. That is fine.

Mr. WILLIAMS. If I may, I would like to come back to the issue of mandatory uncompensated overtime, which is not included in your current bill. First, however, I would like to discuss the provisions that are currently up for discussion, and then come back and spend the remainder of my time on uncompensated overtime, if that is all right.

Senator BINGAMAN. That is fine.

Mr. WILLIAMS. Let me say, first, that I am here representing the Professional Services Council. The details of the Council are well known to you, and it is in the testimony. Mark Schultz is here as the president; I am a director and a former president, and I am on the board of the executive committee.

The views that I am going to express here this morning represent, to the best of our ability to pull together a consensus, the views of the 125 companies in the Professional Services Council plus a number of other associations in the Council which represent additional companies.

SECTION 204, AWARDS WITHOUT DISCUSSION

This is a section that PSC strongly advocates. We think that this legislation, in combination with Mr. Yockey's memorandum of May 4, 1990, is going to go a very long way toward gaining acceptance of the "best value" approach by the acquisition community within DOD. There are several pages of support for this point of view in my testimony. Some of the highlights, we think, are—it will in fact enhance quality; it is an acquisition streamlining methodology; and it will reduce gaming.

The fact of the matter is that contractors are a part of the bidding process and government contracting today involves gaming. Part of the bidding process is trying to determine what your opponents are going to do and what a client really wants, as opposed to what the RFP might imply. We think that, as a result of enacting section 204, the bidding process will move in the direction of providing contractors with comprehensive and meaningful up-front requirements and will enable contractors to submit responsive up-

front proposals. This will reduce the gaming that goes on under the situation that exists today.

We also believe it will result in cost reductions. If people know up-front that their proposal is likely to be accepted on the basis of their first bid, they will sharpen their pencils as much as possible the first time around, knowing they may not get a second chance at it. We think that the enactment of section 204 would be a very positive step forward.

SECTION 205, PROCUREMENT SIMPLIFICATION, UNIFORM THRESHOLD

PSC strongly supports the enactment of this provision. The dollars involved in these small purchase actions constitute a very small portion of the overall total dollars, but they represent a very large number of actions. These numerous, small transactions tend to be very expensive.

SECTION 208, CERTIFIED COST AND PRICING DATA THRESHOLD

We strongly support this provision. We think that raising that threshold would ease the paperwork burden on contractors, and particularly on small businesses, which constitute a large part of the Professional Services Council membership.

SECTION 217, PILOT PROGRAMS

We support the idea of identifying those pilot programs where the Secretary of Defense could employ innovative approaches. We have some concern, however, about the broad sweep of waiver authority. Perhaps there should be some mechanism by which proposed waivers might be sent to the Congress and require disapproval by both Armed Services Committees, otherwise, they could go into effect. Our problem is not with the Secretary of Defense but rather with the people who make these proposals and then implement them. We are somewhat concerned that a proposed waiver might not get the scrutiny that it deserves otherwise.

Other sections in Title II of the proposed Defense Management Improvement Act, generally, have little impact on professional and technical services firms, and we have chosen not to comment on them.

I would like now to go back, if I might, to mandatory uncompensated overtime and speak to that issue. I did not know that Senator Pell was going to be here this morning discussing his bill. I want to reiterate a statement that he made. At the beginning he said that this is a very complex issue. And it is fantastically complex. Unfortunately, some are trying to solve the problem with slogans, but it does not work very well when you do that. It is an extraordinarily complex issue.

Some good news first. The memorandum that Mr. Yockey put out a couple of weeks ago in connection with the forwarding to Congress of the report from the DOD Advisory Committee on Uncompensated Overtime has had some favorable effect already. Mr. Jerry Cann, the Assistant Secretary of the Navy, R&D and Acquisition, has already issued a memorandum rescinding one of the most onerous provisions in the Department of the Navy concerning

guidelines on weighing cost versus quality. Mr. Cann comes out of a background, which I am convinced, enables him to understand the issue of quality versus cost when it comes to procuring professional services. He understands what contract professional services are, and how they are greatly advantageous to the Government. I think that he is moving in the direction of getting the Navy position on this issue cleaned up.

In addition, as a result of representations made by PSC following the publication of the report by the DOD Advisory Committee, there have been conversations between Mr. John Betti and Mr. Don Yockey and members of the Professional Services Council. As a result of that, we are having a meeting on July 6 in Mr. Yockey's office with representatives of that office and DCAA and industry members to see if we can resolve some of the issues that were, in fact, not resolved by that joint committee.

Since my statement is available to you and will be in the record, I would like to give you what some people would consider anecdotal information about how we got ourselves into this mess that we are in and how we might go about getting ourselves out. There are some strongly held differences of opinion, even about whether mandatory uncompensated overtime saves money for the Government or not. We find ourselves in a head-knocking position with Defense, and we simply do not seem to be able to get together.

Let me say for the record that on page 4 of my testimony, about half-way down, the last line of the second full paragraph, there is a typographical error. The testimony refers to a now-departed Navy officer, and that should be Navy official. It was a civilian, not a military person.

I first ran into the issue of uncompensated overtime when the president of one of my competitors sat in my office, 10 years ago or so, and said, "We have formed this company and we found out a way we are going to be able to increase our competitiveness and reduce our costs to the Government."

I said, "What is that?" He said, "Well, we are all working very hard. We are working 10 hours a day and we might as well get credit for that." Okay, that seemed reasonable. So I said, "So what?" He said, "We are going to start charging the full 10 hours a day on our time sheets and we are going to report a 50-hour work week to the Government."

I said, "Okay, so?" He said, "Well, then the hourly rates will go down because we are not increasing our salaries." I said, "Okay, you report 50 hours. The hourly rate goes down, but your salaries remain the same, your cost to the Government for your work remains the same. What is the saving to the Government? There is not any."

He said, "Well, you know that and I know that, but the contracting officers seem to believe it makes a difference."

That was my introduction to uncompensated overtime.

In essence, the situation today is no more complex than that. Uncompensated overtime is a gimmick. It is an accounting gimmick. People are not being paid any more nor any less to work 10 hours a day than they were to work 8 hours a day.

Now, if you believe that professional services are just a rent-a-body operation, that what really matters is how many hours a day

people sit in a office whether they are working productively or staring out the window, then I agree that you can make a case that the Government is getting a better deal if they sit in there for 10 hours a day at $20,000 a year, as opposed to sitting there for 8 hours a day at $20,000 a year.

That is not the issue with professional services. The issue is what sort of a quality product are you getting, and do you get more of a quality product by having people in the office 10 hours a day as opposed to 8 hours a day?

Now, you can carry that argument to the extreme and say, wait a minute, how can you argue that. If you argue that there is no difference, why do we not have a 6-hour day. Or indeed, a 4-hour day. Would you argue that people give you just as much work in 4 hours as they do in 8? No, I would not argue that.

The other extreme, however, is what is the limit? If you do not agree that there is any limit at which people become less productive, at which they are accustomed to working, which is the industry standard, and which professionals are going to accept, what is the limit? The accepted standard has been the 40-hour week.

The correction that I made in the testimony bears on that point. A now-departed Navy official, when asked in public, what will the Navy accept as the outer limit on how many hours they will believe that a contractor will work his employees a week, responded, in public, "seven times 24." Now, I do not think anyone on this subcommittee would believe that answer. I do not think you would accept that if I told you that is how long our people were working.

What is a believable number? A believable number is anything you are willing to say your employees will work and the contracting officer will accept. That is what is going on today. DOD continuously goes back to surveys run 2, 3, and 4 years ago and says, this is not a big problem, that we are only talking about 2, 3, or 4 hours a week overtime. That was what it was when it started. That is a fact.

But anyone in his right mind can figure out that if a customer believes that there is an advantage, the number of hours the companies are telling their people they are going to have to work will continue to escalate until the whole thing blows up in a scandal.

Why do I say a scandal? Because at some point the number becomes so unrealistic that nobody will believe that people are really working the hours that they are putting down on their time sheets.

That is, in fact, what is happening already. All I have is anecdotal evidence. I do not have the FBI or the DCIS at my command to go look at these things. But employees are coming to me, telling me to hold tight, hang fast, do not give up on this issue. These employees are telling me that they came to BDM from a company where they were required to put down 10 hours a day on their time sheet, whether they worked it or not.

That is anecdotal. One person has told me that. More people than that have come to me from other companies and said, we are being told by our companies that, "If I get in the car in the morning and instead of turning on my radio, I think about my job on the way into work, then I can put that time down on my time sheet."

Senator, this is a scandal. It is going to be a bigger scandal if we do not put a stop to it. You will find there are arguments that industry should police itself. We should all stop doing this, and we should agree on a 40-hour week. I think you heard the Congressman say it is his opinion that it is a violation of the Antitrust Act for us to get together and agree on that sort of thing. My legal counsel tells me the same thing; I cannot do that.

As a matter of fact, one of the members of the Professional Services Council who disagrees with the Council position threatened to sue the Council and the other members if we continued to discuss this issue in Professional Services Council board meetings. That is how serious this issue is.

Now, I would like to discuss, illustratively, the practice. Go back to the issue of rent-a-body engineers. If you have people working on a contract who are totally under the control of the client agency as to their use, and if the company merely provides the bodies and is not responsible for the product on a particular contract, if you assume that engineers with a fixed annual salary are bid at a workweek in excess of 40 hours, you can show in the short term for that particular contract that there is a saving to the Government as against a bid based on a 40-hour workweek. The hourly rate appears to go down. But that is a very small part of the total problem.

Most of the companies involved here are doing all their work for the Government. Where is the saving? Right now, in my own company, we are having a problem with the Defense Contract Audit Agency. They are trying to force us to go to what they call full-time accounting. we are strictly a 40-hour-a-week organization in terms of what we put down on the time sheets. DCAA has come into our organization and back in 1988 made a selected sampling of our people for floor checks. They are now claiming that BDM should have a 56-hour work week. A sample of 49 people was surveyed and the average number of hours that they were working overtime was 16 hours per week.

DCAA is now trying to force us to bid rates discounted on an hourly basis by that amount. How will this save the Government money? Well, it is perfectly clear if we do that, the direct labor rates will fall. What happens to the "saved" money? Where does the money come from to pay those people? What did they say the people were doing? They said they were working on proposals. The Government pays for proposals; it goes into the overhead. Yes, the direct labor rate goes down, but the overhead goes up. Where is the saving to the Government? This is accounting legerdemain. This is smoke and mirrors. There is no real saving to the Government occurring in the long term.

Mandatory uncompensated overtime is having a debilitating effect on the professional services work force. It is leading us into a spiral which is only going to get us all in trouble. I think it is incumbent upon the industry, the DOD and the Congress to come to some conclusion of how we can bring this to an end.

I was particularly annoyed and irritated by a particular portion of the report that came out of DOD on Senator Pell's bill. It said, DOD cannot support the bill and what would have been the DOD equivalent of that because it would be a restraint of competition.

We are already restrained. DOD already has numbers of regulations which constrain competition, if you want to look at it that way. The Service Contract Act, Department of Labor wage determinations, both set minimums on primarily non-professionals, but they set minimums of what you can offer people when you go in and pick up a continuation contract.

There are all kinds of regulations. They audit our fringe benefits, they audit our salary structure, they tell us what kind of facilities are too plush—we have monumental-type regulations. Why in the world the DOD should pick out this one simple issue, and it is a simple issue, even though the solution is terribly complex, to say that to act on this one is a restraint of competition, simply escapes me. It makes no sense to me whatsoever.

Representatives of the Professional Services Council met with Mr. Betti, and we deliberately chose a cross-section of companies. We took in a billion dollar company, we took in two others in the $100 million to $500 million category, and we took in one in the under $50 million category. Two of those companies were using mandatory uncompensated overtime to date; two of us were not.

We told DOD that among those varying size companies and among the companies using it and not using it, unanimously, we are opposed to it. We are opposed to it. We cannot just stop. We are not allowed to stop. With DCAA insisting that we go to full-time accounting, and they have forced some of the companies to go to full-time accounting, you are forced to use their view of what your labor rates are rather than what the actual labor rates are. This is a situation that simply must be brought to a halt since it forces companies to practice mandatory uncompensated overtime whether they want to or not.

As I said, there is some good news out there. We are meeting soon with DOD. It may be that we have gotten the attention of the policy-makers in DOD. Maybe they are going to work with us to try to resolve this issue. I am withholding judgment. You may recall, Senator, that I brought this up at the Defense Industry Advisory Group meetings 2 years ago and, in fact, had the recommendations that came out of that group been adopted by DOD as policy, we would not be sitting here today talking about this issue.

So, it is not as though the Senate and the Congress have not tried. It is not as though the industry has not tried. It is that we cannot get the reaction we need out of DOD. Until they indicate their willingness to accept this as a serious policy problem and to help us solve it, I think we have to keep this on the front burner.

Thank you, sir.

[The prepared statement of Mr. Williams follows:]

EARLE C. WILLIAMS

PRESIDENT

BDM INTERNATIONAL, INC.

MR. CHAIRMAN AND MEMBERS OF THE SUBCOMMITTEE:

I WANT TO THANK YOU AND YOUR COLLEAGUES FOR THIS OPPORTUNITY TO APPEAR BEFORE THE SUBCOMMITTEE TODAY. MY INTENTION TODAY IS TO BRING TO YOUR ATTENTION SOME OF THE CRITICAL ISSUES THAT CONFRONT THE PROFESSIONAL AND TECHNICAL SERVICES INDUSTRY AND WHICH, CONSEQUENTLY, WILL HAVE CONSIDERABLE EFFECT UPON ITS ABILITY TO PERFORM ITS ROLE AS AN ESSENTIAL PART OF OUR COUNTRY'S DEFENSE INDUSTRIAL AND TECHNOLOGICAL BASE.

I AM APPEARING TODAY ON BEHALF OF THE PROFESSIONAL SERVICES COUNCIL (PSC), WHICH REPRESENTS OVER 125 COMPANIES, AS WELL AS OTHER PROFESSIONAL ASSOCIATIONS. PSC MEMBERS INCLUDE RESEARCH AND DEVELOPMENT FIRMS, INDEPENDENT LABORATORIES AND TEST FACILITIES, PROGRAM ANALYSIS AND EVALUATION COMPANIES, ARCHITECT AND ENGINEERING FIRMS, SYSTEMS INTEGRATION AND SUPPORT ACTIVITIES, COMPUTER SOFTWARE DEVELOPMENT AND PUBLIC ACCOUNTING FIRMS, AMONG OTHERS.

AS PRESIDENT AND CHIEF EXECUTIVE OFFICER OF BDM INTERNATIONAL, INC., I HAVE BEEN AN ADVOCATE AND SUPPORTER OF THE PROFESSIONAL AND TECHNICAL SERVICES INDUSTRY FOR MORE THAN TWO DECADES. I AM A PAST PRESIDENT OF PSC AND NOW SERVE AS A DIRECTOR OF PSC AND AS A MEMBER OF ITS EXECUTIVE COMMITTEE. MR. CHAIRMAN, YOU WILL RECALL THAT IN JULY OF 1987, YOU AND SENATOR GRAMM INVITED ME TO BECOME A MEMBER OF THE DEFENSE INDUSTRY ADVISORY GROUP (DIAG). UNDER YOUR AND SENATOR GRAMM'S LEADERSHIP, THE GROUP EXAMINED THE ISSUES THAT AFFECTED THE HEALTH AND VITALITY OF THE DEFENSE INDUSTRIAL BASE AND ITS SUPPORTING TECHNOLOGY. THE DIAG REPORT WAS RELEASED BY YOUR SUBCOMMITTEE FOR PUBLIC COMMENT IN FEBRUARY OF 1988. SOME OF THE RECOMMENDATIONS HAVE BEEN PUT IN PLACE THROUGH LEGISLATION OR REGULATORY ACTION, BUT OTHERS STILL AWAIT IMPLEMENTATION.

THE DEFENSE MANAGEMENT IMPROVEMENT ACT, S. 2440, WHICH YOUR SUBCOMMITTEE NOW IS CONSIDERING, IS ANOTHER STEP TOWARD ADDRESSING SOME OF THE ISSUES THAT WERE STUDIED BY THE DIAG. I WOULD LIKE TO ADDRESS THOSE PROVISIONS OF S. 2440 THAT AFFECT THE PROFESSIONAL AND TECHNICAL SERVICES INDUSTRY, AS WELL AS ONE ISSUE NOT INCLUDED IN THE PROPOSED LEGISLATION, NAMELY THE PRACTICE OF MANDATORY UNCOMPENSATED OVERTIME.

## MANDATORY UNCOMPENSATED OVERTIME

MANDATORY UNCOMPENSATED OVERTIME IS NOT A NEW SUBJECT FOR SUBCOMMITTEE

CONSIDERATION. IT WAS STUDIED BY THE DIAG, AND RECOMMENDATIONS WERE MADE TO THE SUBCOMMITTEE THAT, AS A PRACTICAL MATTER, WOULD HAVE ELIMINATED MANDATORY UNCOMPENSATED OVERTIME. MOREOVER, CONGRESS, IN SECTION 804 OF THE NATIONAL DEFENSE AUTHORIZATION ACT OF 1989, DIRECTED THE SECRETARY OF DEFENSE TO ESTABLISH A DEFENSE-INDUSTRY ADVISORY COMMITTEE TO MAKE RECOMMENDATIONS TO HIM ON CRITERIA TO ENSURE THAT PROPOSALS FOR CONTRACTS FOR PROFESSIONAL AND TECHNICAL SERVICES WERE EVALUATED ON A BASIS THAT DID NOT ENCOURAGE MANDATORY UNCOMPENSATED OVERTIME. THE SECRETARY'S RECOMMENDATIONS WERE TO BE SENT TO THE ARMED SERVICES COMMITTEES OF BOTH HOUSES OF CONGRESS WITHIN FOUR MONTHS OF THE ENACTMENT OF THE ACT, WHICH WAS SEPTEMBER 28, 1988. IN FACT, THEY WERE FORWARDED IN MARCH 1990.

MR. CHAIRMAN, LET ME QUICKLY REVIEW WHAT WE MEAN BY MANDATORY UNCOMPENSATED OVERTIME. THIS IS THE PRACTICE OF REQUIRING PROFESSIONAL EMPLOYEES, WHO ARE EXEMPT FROM THE FAIR LABOR STANDARDS ACT, TO WORK REGULARLY IN EXCESS OF A NORMAL 40 HOURS PER WORKWEEK, WITHOUT ADDITIONAL COMPENSATION, IN ORDER TO MEET THE TERMS OF A GOVERNMENT CONTRACT. THE EXTRA HOURS INCLUDED IN AN OFFER (PROPOSED) MUST BE PERFORMED AND ACCOUNTED FOR TO THE GOVERNMENT. IN OUR INDUSTRY, MANY, IF NOT MOST, PROFESSIONALS WORK MORE THAN 8 HOURS A DAY AND 40 HOURS A WEEK WHEN THE NEED ARISES. THEY DO THIS, HOWEVER, BECAUSE OF PROFESSIONAL PRIDE, TECHNOLOGICAL CHALLENGE, AND PERSONAL AMBITION--NOT BECAUSE THE TERMS OF A CONTRACT MANDATE IT.

PSC HAS FOR A NUMBER OF YEARS BEEN OPPOSED TO THE PRACTICE OF MANDATORY UNCOMPENSATED OVERTIME. THERE ARE, QUITE CANDIDLY, A FEW FIRMS THAT EMPLOY THAT PRACTICE BY CHOICE, AN INCREASING NUMBER HAVE BEGUN TO USE IT AS A DEFENSIVE MECHANISM IN THIS INCREASINGLY COMPETITIVE MARKETPLACE, AND THE DEFENSE CONTRACT AUDIT AGENCY (DCAA), BY ATTEMPTING TO FORCE ALL DEFENSE CONTRACTORS TO USE FULL-TIME ACCOUNTING, IS ENCOURAGING THE PRACTICE. PSC MEMBERS ARE ALMOST UNANIMOUSLY OF THE VIEW THAT THIS PRACTICE SHOULD END. PSC BELIEVES THAT THIS PRACTICE OF MANDATORY UNCOMPENSATED OVERTIME, IN THE LONG-TERM, WILL CAUSE A DETERIORATION IN THE QUALITY OF WORK WE ARE PROVIDING TO OUR CLIENT, THE U.S. GOVERNMENT; WILL THREATEN THE STABILITY OF THE INDUSTRY; AND, WILL UNDERMINE THE MEANINGFUL CONTRIBUTION WE MAKE TO OUR NATION'S DEFENSE INDUSTRIAL AND TECHNOLOGICAL BASE AND ECONOMY. WE ARE DEEPLY CONCERNED THAT THE CONTINUED USE AND PROBABLE GROWTH OF THIS PRACTICE WILL CREATE SERIOUS PROBLEMS OF HUMAN RESOURCES MANAGEMENT AND WILL ENCOURAGE QUALITY PERSONNEL TO LEAVE THE SECTOR OF THE INDUSTRY SUPPORTING THE DEFENSE ESTABLISHMENT FOR OTHER SECTORS. IN ADDITION, SINCE MUCH OF THE UNCOMPENSATED OVERTIME IS NEITHER MANAGED NOR SUPERVISED, THE OPPORTUNITY FOR IMPROPER TIME-CARD CHARGING IS VERY LARGE. IT WAS IN THIS CONTEXT THAT PSC ACTIVELY PARTICIPATED IN THE DELIBERATIONS OF THE DEPARTMENT OF DEFENSE-INDUSTRY ADVISORY COMMITTEE (ADVISORY COMMITTEE).

THE REPORT ON UNCOMPENSATED OVERTIME PREPARED BY THE ADVISORY COMMITTEE WAS FORWARDED TO CONGRESS BY UNDER SECRETARY OF DEFENSE FOR ACQUISITION

JOHN BETTI ON MARCH 29, 1990, AND AN IMPLEMENTING MEMORANDUM WAS SIGNED BY MR. DONALD J. YOCKEY, PRINCIPAL DEPUTY UNDER SECRETARY FOR ACQUISITION, ON MAY 4, 1990. THE REPORT AND THE IMPLEMENTING MEMORANDUM REFLECTED PROGRESS AND SOME MEETING OF THE MINDS BETWEEN DOD AND THE SEVEN PARTICIPATING INDUSTRY ASSOCIATIONS THAT SERVED ON THE ADVISORY COMMITTEE. THE REPORT SPECIFICALLY STATED, AS DID MR. BETTI'S LETTER OF TRANSMITTAL, THAT THERE WAS DISAGREEMENT BETWEEN DEFENSE AND INDUSTRY ON THE INDUSTRY RECOMMENDATION THAT COMPETITIVE PROPOSALS FOR THE PROCUREMENT OF PROFESSIONAL AND TECHNICAL SERVICES BE EVALUATED ON A 40-HOUR WORKWEEK BASIS. MR. CHAIRMAN, OUR INDUSTRY FIRMLY BELIEVES THAT THIS STANDARD IS NECESSARY IF THERE IS TO BE A "LEVEL PLAYING FIELD" FOR ALL COMPETITORS. THIS WAS THE INDUSTRY POSITION IN THE DIAG REPORT IN 1988; THIS WAS THE INDUSTRY POSITION DURING THE DISCUSSIONS OF THE ADVISORY COMMITTEE THAT TOOK PLACE IN 1989; AND, THIS CONTINUES TO BE THE PSC POSITION TODAY. (A COPY OF THE PSC POSITION ON MANDATORY UNCOMPENSATED OVERTIME IS ATTACHED.)

DOD'S STATED POSITION IS THAT IT CANNOT ADOPT OUR RECOMMENDATION TO EVALUATE COMPETITIVE PROPOSALS ON THE BASIS OF A 40-HOUR WORKWEEK BECAUSE IT COULD BE CONSIDERED A "RESTRAINT OF COMPETITION." I FIND THAT DIFFICULT TO UNDERSTAND. MANY ASPECTS OF GOVERNMENT CONTRACTING--BENEFITS, COMPENSATION LEVELS, BID AND PROPOSAL FUNDS, PROFIT POLICY--ARE REGULATED BY THE GOVERNMENT. THE SERVICES CONTRACT ACT AND DEPARTMENT OF LABOR WAGE DETERMINATIONS FOR DEFENSE CONTRACTS EXPLICITLY SET MINIMUM CONTRACTOR PAY FOR SPECIFIC JOBS. YET, CREATING A LEVEL PLAYING FIELD THROUGH "NORMALIZATION" OF BID PROPOSALS IS CONSIDERED BY DOD TO BE AN UNACCEPTABLE RESTRAINT OF COMPETITION. AS WE SEE IT, THAT SIMPLY DOES NOT MAKE SENSE.

INDUSTRY WOULD HAVE PREFERRED, AS WOULD HAVE CONGRESS, TO HAVE HAD THE ISSUE OF MANDATORY UNCOMPENSATED OVERTIME BE RESOLVED BY REGULATORY ACTION. HOWEVER, IT NOW IS CLEAR THAT LEGISLATIVE ACTION, AS REFLECTED IN S. 2239 INTRODUCED BY SENATOR PELL AND H.R. 3651 INTRODUCED BY REPRESENTATIVE MACHTLEY, IS THE BEST WAY TO RESOLVE THIS ISSUE. WE ARE AT A CRITICAL JUNCTURE IF WE ARE TO FORESTALL MANDATORY UNCOMPENSATED OVERTIME FROM BECOMING A MAJOR DISRUPTIVE FORCE WITHIN THE PROFESSIONAL AND TECHNICAL SERVICES INDUSTRY.

WE ALL ARE AWARE OF DECLINING BUDGETS AND A SMALLER MARKETPLACE OF GOVERNMENT CONTRACTS. THIS ENVIRONMENT IS INTENSIFYING COMPETITION AND WILL CAUSE COMPANIES TO MAKE INCREASED USE OF UNCOMPENSATED OVERTIME TO GAIN WHAT THE GOVERNMENT IS ACCEPTING AS A COMPETITIVE ADVANTAGE. MANAGEMENT HAS A RESPONSIBILITY TO COMPANY OWNERS AND SHAREHOLDERS TO WIN CONTRACTS AND TO BE PROFITABLE. THAT MEANS USING ALL AVAILABLE TACTICS AND TECHNIQUES THAT GIVE YOU AN EDGE OVER YOUR COMPETITORS, INCLUDING USING MORE IN THE WAY OF UNCOMPENSATED OVERTIME HOURS THAN YOU THINK YOUR COMPETITOR IS USING. THIS HAS A SPIRALING EFFECT WHICH FORCES COMPANIES TO WORK THEIR PROFESSIONAL EMPLOYEES,

OR TO CLAIM THEY WORK THEM, 50 TO 60 HOURS PER WEEK ON A PROLONGED BASIS. WHEN ASKED WHAT THE GOVERNMENT WOULD ACCEPT AS A BELIEVABLE LIMIT ON TOTAL HOURS OF TIME WORKED PER WEEK, A NOW DEPARTED NAVY OFFICER REPLIED, "SEVEN TIMES TWENTY-FOUR!"

FAIR COMPETITION BENEFITS THE GOVERNMENT AND INDUSTRY. FAIR COMPETITION, HOWEVER, SHOULD BE BASED ON THE PRINCIPLE OF A LEVEL PLAYING FIELD AND ON CONSTRUCTIVE FACTORS SUCH AS PRODUCTIVITY, CREATIVENESS, MANAGEMENT EFFECTIVENESS, AND QUALITY PERFORMANCE AND NOT ON SUCH NEGATIVE ELEMENTS AS THE WAGE-BUSTING EFFECTS OF MANDATORY UNCOMPENSATED OVERTIME. COMPETITION BASED ON SUCH NEGATIVE ELEMENTS IS DESTRUCTIVE TO INDUSTRY AND IS A DISSERVICE TO THE GOVERNMENT.

AS PREVIOUSLY NOTED, THE USE OF MANDATORY UNCOMPENSATED OVERTIME CREATES HUMAN RESOURCES MANAGEMENT PROBLEMS OF ENORMOUS MAGNITUDE. THIS ISSUE IS PARTICULARLY CRITICAL IN THE LABOR-INTENSIVE PROFESSIONAL AND TECHNICAL SERVICES INDUSTRY. OUR ASSETS ARE THE KNOWLEDGE AND EXPERIENCE OF OUR MANAGEMENT AND THE SCIENTISTS, ENGINEERS, AND OTHER SKILLED PROFESSIONALS AND EXPERTS WHO CONSTITUTE THE INDUSTRY WORK FORCE. THE INSIDIOUS AND UNPROFESSIONAL ASPECT OF UNCOMPENSATED OVERTIME ARISES WHEN THE EXTRA HOURS MUST BE PERFORMED TO FULFILL CONTRACT REQUIREMENTS, AND IT, THEREFORE, BECOMES MANDATORY. TALENTED PEOPLE, LIKE THOSE IN OUR INDUSTRY, WHO ARE FORCED TO WORK OVERTIME REGULARLY OVER LONG PERIODS OF TIME, WITHOUT APPROPRIATE EXTRA COMPENSATION, WILL BEGIN TO PERFORM POORLY AND, MORE IMPORTANTLY, WILL BEGIN TO LEAVE OUR INDUSTRY.

THE SCIENTISTS, ENGINEERS, AND OTHER PROFESSIONALS WHO ARE LOST BY OUR INDUSTRY ARE LIKELY TO BE OUR BEST AND BRIGHTEST PEOPLE WHO READILY CAN FIND EMPLOYMENT ELSEWHERE. THOSE INDIVIDUALS ARE THE INNOVATORS, THE CREATIVE ONES, THE ONES WITH THE IDEAS AND IMAGINATION THAT HAVE ENABLED THIS COUNTRY'S DEFENSE INDUSTRIAL AND TECHNOLOGICAL BASE TO PROVIDE OUR MILITARY ESTABLISHMENT WITH A TECHNOLOGICAL ADVANTAGE OVER ALLIES AND ENEMIES SINCE THE BEGINNING OF WORLD WAR II. ALTHOUGH THE WORLD POLITICAL ENVIRONMENT MAY BE CHANGING, NATIONAL SECURITY CONSIDERATIONS DEMAND THAT THAT TECHNOLOGICAL ADVANTAGE, WHICH HAS CHARACTERIZED OUR DEFENSE INDUSTRIAL BASE, BE MAINTAINED AND NOT ENDANGERED. THE USE OF MANDATORY UNCOMPENSATED OVERTIME WITHIN THE PROFESSIONAL AND TECHNICAL SERVICES INDUSTRY, IN THE LONG-TERM, WILL WEAKEN THAT ADVANTAGE.

I ALSO WOULD NOTE THAT THE PRACTICE OF MANDATORY UNCOMPENSATED OVERTIME IS SUBJECT TO ABUSE. IN ITS MOST EXTREME FORM, THIS PRACTICE ENCOURAGES GAMESMANSHIP THROUGH THE USE OF "CREATIVE ACCOUNTING AND CREATIVE TIME-CARD REPORTING" THAT CAN LEAD TO IRREGULARITIES AND FRAUD AS UNSUPERVISED EMPLOYEES DEFINE AND RECORD THE ACTIVITIES AND WORK HOURS REQUIRED TO MEET CONTRACT COMMITMENTS. DEFENSE, BY ENCOURAGING OR PERMITTING THE PRACTICE OF MANDATORY UNCOMPENSATED OVERTIME IN THE HIGHLY-COMPETITIVE ENVIRONMENT FACING THE

PROFESSIONAL AND TECHNICAL SERVICES INDUSTRY, IMPLICITLY IS CREATING A SERIOUS THREAT TO THE PROFESSIONALISM AND INTEGRITY OF OUR INDUSTRY. THE PRACTICE OF MANDATORY UNCOMPENSATED OVERTIME IS A SCANDAL WAITING TO HAPPEN OR TO BE REPORTED BY THE MEDIA.

IN LIGHT OF THE FACT THAT DOD APPARENTLY DOES NOT SHARE INDUSTRY'S SENSITIVITY TO AND CONCERN WITH THE PROBLEM OF MANDATORY UNCOMPENSATED OVERTIME AND THAT GRASS-ROOTS PRESSURE TO EFFECT A "LEVEL PLAYING FIELD" CONTINUES TO INCREASE, PSC STRONGLY URGES THE INCLUSION OF S. 2239 IN THE DOD AUTHORIZATION BILL NOW BEING CONSIDERED BY YOUR SUBCOMMITTEE.

PLEASE LET ME NOW SHARE WITH THE SUBCOMMITTEE PSC'S VIEWS ON THE PROPOSED DEFENSE MANAGEMENT IMPROVEMENT ACT. THERE ARE MANY PROVISIONS IN THE PROPOSED LEGISLATION THAT ARE NOT APPLICABLE TO THE PROFESSIONAL AND TECHNICAL SERVICES INDUSTRY. THERE ARE SEVERAL, HOWEVER, IN WHICH WE HAVE A STRONG INTEREST.

SECTION 204: AWARDS WITHOUT DISCUSSION

PSC STRONGLY ADVOCATES THE ENACTMENT OF THIS PROVISION. WE BELIEVE THAT THIS LEGISLATION, IN COMBINATION WITH MR. YOCKEY'S MEMORANDUM OF MAY 4, 1990, WILL GO A LONG WAY TOWARDS GAINING ACCEPTANCE OF THE "BEST VALUE" APPROACH BY THE ACQUISITION COMMUNITY WITHIN DOD. THE CULTURE AND THE CURRENT ENVIRONMENT OF THAT COMMUNITY TENDS TO THINK IN TERMS OF "LOWEST CONTRACT PRICE" WHEN MAKING AWARDS. THE PROPOSED SECTION AND THE YOCKEY MEMORANDUM WILL HELP OVERCOME THIS "LOWEST CONTRACT PRICE" SYNDROME, WITH MORE CONSIDERATION BEING GIVEN TO PROPOSALS THAT ARE MOST ADVANTAGEOUS TO THE GOVERNMENT--PRICE, TECHNICAL EXCELLENCE, QUALITY PERFORMANCE, AND OTHER FACTORS CONSIDERED.

SECTION 204 IS OF PARTICULAR IMPORTANCE TO THE PROFESSIONAL AND TECHNICAL SERVICES INDUSTRY. THE CHANGE BEING PROPOSED WOULD PROVIDE DOD WITH MAXIMUM FLEXIBILITY AND CHOICE IN CONTRACT-AWARD DECISIONS. IT WOULD NOT PRECLUDE DOD FROM AWARDING CONTRACTS WITHOUT DISCUSSIONS TO THAT OFFEROR WITH THE LOWEST OVERALL COST NOR WOULD IT PRECLUDE DOD FROM HOLDING DISCUSSIONS WHERE WARRANTED. PSC BELIEVES THAT ENACTMENT OF THIS PROVISION PROVIDES THESE ADVANTAGES:

ENHANCED QUALITY - THE ABILITY TO SELECT OTHER THAN THE LOWEST-COST OFFEROR BASED ON INITIAL PROPOSALS PROVIDES THE GOVERNMENT A CHOICE, IN THAT THE CONTRACT AWARD CAN BE MADE TO AN OFFEROR WHO PROVIDES HIGHER TECHNICAL VALUE AT A SOMEWHAT HIGHER PRICE, PROVIDED THAT THE PRICE OFFERED IS CONSIDERED FAIR AND REASONABLE AND WITHIN BUDGET. IN BRIEF, THE GOVERNMENT HAS THE OPPORTUNITY TO SELECT THE OFFEROR WHO PROVIDES THE GREATEST BENEFIT AND VALUE TO THE GOVERNMENT.

ACQUISITION STREAMLINING - THE EXPANDED ABILITY TO AWARD CONTRACTS BASED ON INITIAL OFFERS WOULD SERVE TO SHORTEN THE PROCUREMENT CYCLE BY ELIMINATING

THE TIME NOW NEEDED FOR ORAL DISCUSSIONS, WRITTEN RESPONSES, AND BAFO TECHNICAL AND COST EVALUATIONS. IN ADDITION, THE REDUCED USE OF DISCUSSIONS SHOULD FOSTER THE PREPARATION OF MORE SPECIFIC AND CONCISE STATEMENTS OF WORK AND REQUIREMENTS DESCRIPTIONS.

REDUCED GAMING - WITHOUT THE IMPLICIT ASSURANCES OF SUBSEQUENT DISCUSSIONS, "GAMING" OF INITIAL COST PROPOSALS SHOULD BE REDUCED, AND CONTRACTORS WOULD BE ENCOURAGED TO PRESENT THEIR BEST AND MOST REALISTIC AND REASONABLE PRICES UPON FIRST SUBMISSION OF PROPOSALS, SINCE THERE WILL BE NO GUARANTEE OF A "SECOND BITE AT THE APPLE." IN ADDITION, THE POTENTIAL AND INCENTIVE FOR WRONGFUL DISCLOSURE OF SENSITIVE PROCUREMENT INFORMATION SHOULD BE REDUCED WITH THE ABSENCE OF DISCUSSIONS AND BAFO OR POSSIBLY MULTIPLE BAFO ROUNDS. FINALLY, THIS APPROACH MAY HAVE THE POSITIVE SIDE EFFECT OF DISCOURAGING BUY-INS AND TECHNICAL LEVELING/COST AUCTIONING, WHILE IMPROVING PERFORMANCE, QUALITY, AND EFFICIENCY.

COST REDUCTIONS - AWARDS BASED ON INITIAL OFFERS WOULD REDUCE CONTRACTOR COSTS FOR BID AND PROPOSAL EXPENSES. WHILE SOME COULD ARGUE THAT CONTRACT-PRICE REDUCTIONS CURRENTLY BEING REALIZED FROM LENGTHY DISCUSSIONS AND BAFOS MAY NOT BE REALIZED WHEN AN AWARD IS MADE ON INITIAL PROPOSALS, SUCH SAVINGS ARE PAST THE POINT OF DIMINISHING RETURNS. THE FACT THAT CONTRACTORS WILL TEND TO OFFER THEIR BEST PRICE WHEN AN AWARD MAY BE MADE ON THE BASIS OF INITIAL OFFERS--AND THAT THE PROCUREMENT CYCLE WILL BE SHORTENED--WILL RESULT IN MORE SAVINGS FOR THE GOVERNMENT.

IN BRIEF, WE BELIEVE THAT THE ENACTMENT OF SECTION 204 WILL IMPROVE THE PROSPECTS FOR EVALUATION OF PROPOSALS ON THE BASIS OF A "BEST VALUE" CONCEPT. THIS WILL PERMIT GREATER APPRECIATION OF QUALITY AND PERFORMANCE, AND NOT JUST COST, IN DOD'S PROCUREMENT OF PROFESSIONAL AND TECHNICAL SERVICES.

SECTION 205: PROCUREMENT SIMPLIFICATION - UNIFORM THRESHOLD

PSC SUPPORTS THE ENACTMENT OF THIS PROVISION. THE DOLLARS INVOLVED IN THESE SMALL PURCHASE ACTIONS CONSTITUTE A VERY SMALL PORTION OF THE OVERALL TOTAL OF APPROPRIATED DOLLARS EXPENDED, BUT A LARGE PERCENTAGE OF THE GOVERNMENT'S OVERALL TOTAL PURCHASE ACTIONS. ESTABLISHING A UNIFORM THRESHOLD FOR SMALL PURCHASES WOULD DO MUCH TO SIMPLIFY THE PURCHASE ACTION PROCEDURE.

SECTION 208: CERTIFIED COST OR PRICING DATA THRESHOLD

WE URGE THE SUBCOMMITTEE TO ENACT THE PROPOSED PROVISION. RAISING THE THRESHOLD WOULD EASE THE PAPERWORK BURDEN ON CONTRACTORS, PARTICULARLY SMALL BUSINESS FIRMS. IT ALSO RECOGNIZES THE REALITY OF INFLATION--THE ORIGINAL THRESHOLD OF $100,000 WAS SET BACK IN 1962. ALSO, RAISING IT TO $500,000 WOULD

HAVE ONLY A MINOR INCREMENTAL IMPACT ON THE DOLLAR VALUE OF THE CONTRACTS THAT, CONSEQUENTLY, WOULD BE EXEMPT FROM CERTIFICATION. IN OUR OPINION, THIS PROVISION WOULD EASE THE COMPLEX ACQUISITION PROCESS FOR BOTH THE GOVERNMENT AND THE CONTRACTOR WITHOUT EXPOSING THE GOVERNMENT TO AN INCREASED THREAT OF WASTE OR FRAUD.

SECTION 217: PILOT PROGRAMS

WE SUPPORT THE IDEA OF IDENTIFYING PILOT PROGRAMS WHERE THE SECRETARY OF DEFENSE COULD EMPLOY INNOVATIVE APPROACHES TO THE PROCUREMENT PROCESS. CERTAINLY, WE ALL ARE AWARE OF THE COMPLEXITIES AND DIFFICULTIES ASSOCIATED WITH THE CURRENT DEFENSE ACQUISITION PROCESS. DOD NEEDS TO BE ENCOURAGED AND ASSISTED TO FIND MORE FLEXIBLE AND BETTER METHODS OF BUYING THE GOODS AND SERVICES IT NEEDS. PSC IS SOMEWHAT CONCERNED, HOWEVER, WITH THE BROAD SWEEP OF "WAIVER AUTHORITY" THAT THE PROPOSED PROVISION WOULD CONFER ON THE SECRETARY OF DEFENSE. WE BELIEVE THAT THAT AUTHORITY SHOULD BE CIRCUMSCRIBED BY REQUIRING THE SECRETARY OF DEFENSE TO NOTIFY THE SENATE AND HOUSE ARMED SERVICES COMMITTEES OF THE SPECIFIC STATUTES TO BE WAIVED. IF DISAPPROVAL BY BOTH COMMITTEES IS NOT FORTHCOMING WITHIN THIRTY DAYS, THEN, AND ONLY THEN, WOULD THE STATUTE BE WAIVED FOR PURPOSES OF THE PILOT PROGRAM. THIS APPROACH WOULD ENABLE THE SECRETARY OF DEFENSE TO BE IMAGINATIVE IN CONSTRUCTING MORE ADVANTAGEOUS PROCUREMENT PROCEDURES BUT STILL WOULD RETAIN THE ELEMENT OF CONGRESSIONAL OVERSIGHT CONSISTENT WITH OUR PRINCIPLES OF GOVERNMENT.

OTHER SECTIONS

THE OTHER SECTIONS IN TITLE II OF THE PROPOSED DEFENSE MANAGEMENT IMPROVEMENT ACT GENERALLY HAVE LITTLE IMPACT ON THE PROFESSIONAL AND TECHNICAL SERVICES INDUSTRY AND, CONSEQUENTLY, PSC HAS TAKEN NO POSITION ON THEM.

IN CLOSING, LET ME EXPRESS THE APPRECIATION OF PSC AND MY OWN PERSONAL APPRECIATION FOR THIS OPPORTUNITY TO EXPRESS OUR VIEWS ON ISSUES CRITICAL TO THE VIABILITY AND HEALTH OF THE PROFESSIONAL AND TECHNICAL SERVICES INDUSTRY, AS WELL AS TO OUR DEFENSE INDUSTRIAL AND TECHNOLOGICAL BASE. I WOULD BE PLEASED TO ANSWER ANY QUESTIONS YOU MAY HAVE.

PROFESSIONAL
SERVICES
COUNCIL

Representing companies
that are creating the
future through innovation,
technology and ideas

ATTACHMENT A
JUNE 11, 1990

THE PROFESSIONAL SERVICES COUNCIL
POSITION ON
MANDATORY UNCOMPENSATED OVERTIME

The Professional Services Council (PSC) participated in all of the meetings held by the Department of Defense Advisory Committee on Uncompensated Overtime (Advisory Committee) to discuss the mandatory uncompensated overtime issue and to provide recommendations to the Secretary of Defense to ensure that proposals for professional and technical services contracts are evaluated on a basis that does not encourage contractors to propose mandatory uncompensated overtime.

PSC expressed its views to the Advisory Committee that contractors should compete on a "level playing field." To accomplish this, PSC recommended that competitive proposals involving the acquisition of professional and technical services, which include mandatory uncompensated overtime in any of its variant forms, be evaluated on the basis of the national standard 40-hour workweek, with emphasis placed on cost realism, cost reasonableness and risk assessment irrespective of the contractors accounting system (whether 40-hour or full-time accounting); that contractors who propose mandatory uncompensated overtime provide a cost submission normalized to a 40-hour per week basis; and, that the contract award be based on the contractor's cost/price proposal, consistent with the contractor's approved accounting system, so as to ensure compliance with applicable cost accounting standards and regulations.

During the Advisory Committee discussions, PSC stated that --

- Mandatory uncompensated overtime is not a normal marketplace response to a competitive environment. It is an aberrant practice with destructive impacts, which are antithetical to the Department of Defense's current goals, reflected in the Defense Management Review, relative to program stability, best value competitive practices, and high-quality products and services.

- Continued, unabated increases in the use of mandatory uncompensated overtime will result in an ongoing erosion of the professional skill base supporting the federal government, increasing the difficulty in attracting new talent to the professional work force, and continuing the degradation of quality.

- Legal research has established that the Secretary of Defense has the authority to require the use of the proposed "normalization"

techniques in the evaluation of proposals.

- A private-sector solution is simply not feasible since, were industry to regulate itself in the bidding process, it would seriously risk violating the antitrust laws. The government, on the other hand, can regulate this area effectively, as it does other procurement practices.
- The "normalization" technique creates a "level playing field" for evaluation of all offerors' proposals, which serves to enhance and to increase full and open competition--the mandate of the Competition in Contracting Act--for all competitors, large, small, small disadvantaged and minority/8(A) businesses alike. In addition, this "normalization" technique allows contractors to submit bids consistent with their approved full-time accounting or 40-hour per week accounting systems.
- The use of the 40-hour standard workweek is long-standing national policy and is embodied in current federal policy as the "normal workweek." There is no rational basis for establishing a second standard of 41, 43, 45, or more hours as the permissible or acceptable level of uncompensated overtime.

PSC did agree during the meetings that there was a need for additional policy guidance to contracting officers--that quality be given proportionately greater consideration than price--in the source selection of more complex, less clearly defined professional and technical services contracts. While the proposed memorandum recommended by the Advisory Committee on best value and cost realism, embodies some important and needed improvements in existing procurement practices, it does not address the mandatory uncompensated overtime problem in the direct manner set forth in the congressional mandate to not encourage the use of mandatory uncompensated overtime in the bidding of professional and technical services contracts.

Senator BINGAMAN. Thank you very much.

Before I go to any questions, let me defer to Senator Wallop for any opening statement that he would like to make.

Senator WALLOP. I do. But in the interest of time, I will insert it in the record, as Mr. Williams did his entire statement.

[The prepared statement of Senator Wallop follows:]

PREPARED STATEMENT BY SENATOR MALCOLM WALLOP

In April we began consideration of the Defense Management Improvement Act of 1990, a package of legislative provisions which the Secretary of Defense has requested to implement the recommendations of the Defense Management Report. Mr. Chairman, I commend you for the thoroughness with which you have sought detailed testimony from interested parties in the executive branch, the General Accounting Office and the private sector. This testimony, combined with the written responses to questions we have submitted to the witnesses, should provide us with a substantial record for making deliberate decisions on the need for the legislative provisions requested by the Department of Defense.

Today we will hear from two of our colleagues in the House and Senate as well as the representatives of three private sector associations. It is clear from the advance testimony the association representatives have provided us that they share with the Department of Defense goal of a more streamlined acquisition system. However, it is also apparent that we will have to give some further consideration to balancing the legitimate interests of both government and the industry as we act on the legislative proposals requested by the Defense Department.

It is my understanding that the Defense Industry and Technology Subcommittee will begin marking up its portion of the Defense Authorization bill after the July 4 recess. I assume that action on the Defense Management Improvement Act will be included as a section of that bill, and I look forward to working with you, Mr. Chairman, to prepare our subcommittee recommendation on the Defense Department package.

Senator BINGAMAN. All right. We will include that in the record.

Let me just start with a question to Mr. Fuqua.

Let me try to get a better sense of this issue of commercial-style acquisition practices. The Truth in Negotiation Act does have an exception to contractors' being required to disclose costs and the pricing data where there is adequate price competition.

Now I guess my question to you is, in your view, why does that exception not solve a lot of the problem that you are concerned about here? Where we have adequate competition, there is an exception to the requirement; where we do not have adequate competition, should there not still be some requirement for disclosure of costs?

Mr. FUQUA. That depends on what type of commercial product you are talking about. If the Government is acquiring a multi-purpose container, I am sure that it is different than, say, buying a newly developed engine or some type of weapons system that has never been made before. And also, if you are buying, say, a jeep that has been procured, a commercial-type produced versus something that is manufactured maybe for the first time. I think that is the distinction we are trying to make in that, Senator.[1]

Senator BINGAMAN. Let me ask any of the three witnesses to comment on the proposal DOD has made to establish a test bid protest forum, which, as I understand it, would take the place of the bid protest authority that the GAO has and that the Board of Contract Appeals has.

Do any of you have a position on that? It may be in your testimony. I did not see a statement by any of you on that. Maybe you do not take a position on it.

Mr. WILLIAMS. We do not in PSC.

Mr. DEHAVEN. Nor do we.

Senator BINGAMAN. None of you have a position on that proposal?

Mr. WILLIAMS. I think we will probably have one before the week is over. I was not aware of that.

Senator BINGAMAN. We would be interested in any point of view that you think we should hear about on that.

Mr. FUQUA. Well, we think we should work within the point of view that everybody understands what the rules are. The same with the part that deals with the pilot program. We think there is merit to that, but it must be with the mutual consent of the contractor involved so that we all understand what the rules are. There may be waivers like progress payments, what type of product liability you may have or performance requirements or other type—technical data rights that you may have. If such bid protest

[1] NOTE: Refer to answer supplied by Mr. Fuqua to questions for the record submitted by Senator Bingaman.

decisions were to be made in the DOD, they should be made at a high enough level to ensure objectivity.

As far as a protest is concerned, I think everybody would still like to understand what the rules are before they get into the game.

I do not think I have to explain that too much to my two friends who serve in the Senate. You have certain procedures and rules that apply in the Senate as well as in the House. Or if you are playing a game of tennis or football, it is good to know what the rules are and where you get thrown out of the game; how far you go.

They are having a little contest in baseball right now. I think the manager of the Baltimore Orioles has requested a change in the rules of protest and what happens and where is the line drawn. I think, one, we would like to know before we get in the game what the rules are and the procedures. While the current process causes considerable delays, there are some advantages to having a third party resolve bid protests.

Senator BINGAMAN. Let me ask on the certified cost and pricing data threshold issue. I think this paper that you prepared, Mr. DeHaven, is very useful where you have indicated your problems with the Inspector General's position on this. I gather your main point is that you think the competition that will be generated by eliminating that requirement will resolve the problem the Government has about basically being overcharged?

Mr. DEHAVEN. Yes, sir. I think, further, that even currently the Government is either overcharged or not overcharged despite the certification. The market forces that have the most impact on the deal that the Government gets are those that are brought forth through competition.

Senator BINGAMAN. The concern, of course, which the IG impressed upon us in the testimony we received, was that without some kind of cost and pricing data disclosure requirement, the contractor has, as he put it, a profound advantage over the Government and the Government has very limited ability to know independently whether the estimates are reasonable or inflated or otherwise.

Now, your response to that is that where there is competition, that problem is taken care of because people will not inflate the price or else they do not get the contract. In situations where there is not effective competition, what is your response?

Mr. DEHAVEN. Well, where there is not effective competition, the contracting officer still has the right to ask for all of that cost or pricing data. And we are not suggesting that he should not have that right to ask for it, given that he has no other grounds, through experience in buying this item or service before or through competition in seeing what other people would charge for it.

Senator BINGAMAN. Let me just follow up here. This FAR regulation which you allude to in your testimony, it indicates that in the area between $25,000 and $100,000 it would be rare that a contracting officer would want this information. You have no problem with a provision which essentially says where there is no effective competition, it would not be rare, that in that case the contracting

office might well determine that it is necessary to get some pricing and cost data.

Mr. DEHAVEN. That is correct. With one proviso, and that is, which goes back to your first question, as long as it works that way, as long as the Government does not just go ahead and ask for it as a matter of course where the CO tries to cover himself or herself. In addition, the Government has the resources to judge whether or not, in most cases, the elements comprising a proposal are in line with the industry norm. The Government can also get a reasonable price through the process of negotiation—whether it is a sole source procurement or competitive.

Currently, the problem with adequate price competition or adequate competition, I have never seen that. I have never seen it happen in 20 years. We are always asked for that backup information because no contracting officer wants to go out on a limb and say, well, we do not need it because there is adequate price and cost competition.

If we can assure that the COs will not do that and just as a matter of course ask for it, we would have no trouble with that. No, sir.

We would suggest, perhaps, that a reasonable approach to this would be to try it for some given period of time, a couple of years perhaps, and increase it to $500,000, index it to inflation and see how it goes. At the end of that period, have an independent body, such as the DCAA, take a look at their data that they have collected over that 2-year period and look particularly at three items.

First, to determine whether the products in this range are being sold to the Government at a reasonable price. Second, to review the cost benefit of the change. And third, to determine whether, as I suggest, there will be more companies entering the marketplace and competition will, in fact, increase.

Senator BINGAMAN. Senator Wallop.

Senator WALLOP. Mr. Chairman, thank you. My observation of the IG's testimony was that this was a case of a bureaucratic attempt to maintain control rather than a business decision that was concerning them. That is just one observation.

Mr. DEHAVEN. You will pardon me if I do not make that observation. [Laughter.]

Senator WALLOP. I can understand why you might not, but I have no such inhibitions. I explored this and I really felt at the end of it that there was no business judgment that was driving that decision. I could not find it; and I looked pretty hard.

Mr. Fuqua, in the other hearing that we had, the confusion surrounding the meaning of the General Accounting Office decisions about the requirements under the Competition in Contracting Act with respect to competitive awards without discussions, seems to be at the heart of DOD's requested change in section 204. One issue seems to be whether an award without discussions may be made on the basis of price only, or on a broader set of cost factors.

When I asked them to clarify whether life-cycle costs could also be the legitimate basis for an award without discussions under current law, they provided an answer, but not to my question.

Again, let me ask, would a clarification of the issue of whether a broader set of cost criteria, such as life-cycle costs, as an appropriate basis for an award without discussions clear up this issue?

Mr. FUQUA. Yes. I think it would help. What we are trying to do—we think that the DOD has overreacted to what the GAO has suggested. And I think there could be some clarification necessary—and here again, we get back to understanding what the rules of the game are before we get into it.

Senator WALLOP. I can understand that, and it is my hope that we might be able to work out some sort of clarification that would be acceptable.

Mr. FUQUA. I think that would be very helpful.

Senator WALLOP. The Professional Services Council recommends that Congress pass a law mandating that all bids for professional and technical service contracts be evaluated using the 40-hour work week standard. But wouldn't the price of such a law be the removal of a significant level of competition? And would it not mean a potential increase in the amounts the Government has to pay?

Mr. WILLIAMS. Not overall. No, sir, it would not. The issue of the hours bid will take you back into the question of what do you mean by professional services and what are you getting and how do you manage it?

All we are asking for, and we are essentially supporting the inclusion of Senate bill S. 2239 in the Defense Authorization bill, all we are asking for is to deal with one issue of how the Government evaluates these proposals. Various companies have different accounting systems. We are not proposing to change all those, although some of us feel very strongly they ought to be changed. But that is to be left to each company.

What we are saying is that if the Government really thinks that they just get this marvelous deal out of uncompensated overtime, then once the bids are in and evaluated on an equivalent basis, then they can work out whether they want it. If they feel that having somebody in their plant that never sleeps, never eats, and never goes to the bathroom, and works seven times 24 hours a week gives them a cost advantage, then fine. But that is not a reasonable basis on which to make a bid. It is not believable. It does not add any value.

As a matter of fact, what it will do, if carried to that kind of an extreme, and we can all differ about where the extreme may be, will be, at some point, to take out all the surge capability. You will have also destroyed the morale of the work force. These people are going to go somewhere else. Why would anyone agree to work a mandatory 56 hours a week at a professional job if they can go somewhere else and work substantially less hours or control the number and timing of the extra hours they work? The fact is that most of us are working far more than 40 hours now. I would love to have a 45-hour work week. It would be a substantial improvement in my quality of life.

The issue is not what is the Government getting. The question is can you measure professional services time the way you do beans and other commodities. To be useful to the Government, professional services time needs to be managed, directed and supervised by

the company that is furnishing it. Otherwise, it is just a rent-a-body operation.

Senator WALLOP. I hear what you are saying, and I am concerned about the ultimate consequence. But I just wonder if we are not shooting the wrong dog. It is a question of competence in the contracting officers or officials, it seems to me. I have a hard time thinking that we should pass some kind of requirement saying it is the obligation of the offeror to examine the otherwise legal acts of the proposer.

Now, value is another thing. And to the extent that you can determine value versus cost, that is a benefit. But that is part of the skills of being a contracting officer; is it not?

Mr. WILLIAMS. Senator, I wish—what you are talking about is the best of all possible worlds. And I would devoutly join you in saying that I wish that that is the way the system works, but it does not. The fact that it——

Senator WALLOP. Let me just finish—I just received a note saying that my time is up, but I would like you to please finish after my question.

You get legislatively mandated consideration of only one element of value. And my question, as you answered the previous comment, is: does not that, by itself, begin a new distortion in the whole system of value?

Mr. WILLIAMS. Not at all. It seems to me that it puts everything on a common ground. And you can start from there. To me, as far as I am concerned, if you chose to say, well, we think the professionals working on government contracts really ought to be working a 44 hour week, I probably would support that. The issue is that you cannot continue this process of allowing contracting officers to believe, and have no basis for disbelieving, that there is no limit on how many hours you can bid. If a company says, we will start out with 42. Well, I have got to be more competitive the next time, I will say 44. Next time it is 60.

We are up to 60 hours, Senator, in some cases. What is to prevent it from going to 65? There is not anything.

Senator WALLOP. Reason.

Mr. WILLIAMS. Well, sir, reason has already been shown not to control in this case. That is precisely my point. We are at a point at which reasonableness has not worked, and I think you would agree that reasonable people can differ about what is reasonable.

We are to the point now where the first liar doesn't have a chance, if you will pardon the expression. And we are to the point where in order to make these bids appear to be more competitive, in fact they are not, but to make them appear more competitive on an hourly basis, people are willing to say most anything. We have evidence of that.

Senator WALLOP. I understand the nature of the problem. I am troubled by the proposed solution.

Mr. WILLIAMS. Senator, I would much prefer not to have legislation. I think we have far too many laws already, and had we been able to solve this with the DOD, it would have been far preferable. As far as I can see, the ability of DOD to solve this problem exists. I do not think that is the issue at all.

It is like the profit policy issue we got into a couple of years ago, which you may recall, in which Congress passed a law about reducing profits and DOD immediately tried to sock it to the professional services industry. Instead of getting a 10 percent cut, they tried to hit us for a 30 to 45 percent cut. You may recall that.

Senator WALLOP. I do.

Mr. WILLIAMS. Congress was not responsible for that. But you folks had to get into the act on our behalf to force DOD to be reasonable again. What we are saying here is that we have tried to work it out.

Senator, I have got a pack of correspondence this thick [indicating] going into the DOD about this issue over the past 2 years. Do you know what I have gotten back in response to that? Not one single sheet. Not one single letter. Not one single response. It is not reasonable, Senator.

Senator WALLOP. I understand that. But I really do want to make certain that when I pull that trigger, I kill the dog that is biting. [Laughter.]

Mr. WILLIAMS. I could not agree with you more. And as I said in my introductory remarks, I am hoping that as a result of the conversations that we have now opened with DOD, that the people in the policy-making positions, as opposed to the bureaucratic positions, will come to terms with this and help us collectively work out a solution so that you, in fact, will not have to deal with it.

Senator WALLOP. Thank you very much. Thank you, Mr. Chairman.

Senator BINGAMAN. Let me just follow up on that. Mr. Williams, as I understand it, your suggestion is that we would continue to have competition between contractors, professional service contractors, on the basis of what they would charge.

Mr. WILLIAMS. Yes.

Senator BINGAMAN. And we would continue to have competition between contractors on the basis of the quality of the work, of course.

Mr. WILLIAMS. Right.

Senator BINGAMAN. But that in evaluating what they would charge, you do not think they should be able to use the gimmick of claiming that they are working more hours than their competitor?

Mr. WILLIAMS. Right. Senator, when you are comparing quality and trading off against price, tell me what sort of a person you are going to give me on this job, what his credentials are and what is his yearly salary. Then I think we get to it. What are you paying this individual per year? That will tell you something. Salaries do count. Compensation matters. And particularly in a free marketplace, you get your best people if you pay the highest amount. So do that.

Senator BINGAMAN. So you could substitute for the hourly charge, you could essentially say we will have a software engineer work on this so many hours, and this is a person who is compensated at the following level on a yearly basis.

Mr. WILLIAMS. Right. Precisely.

Senator BINGAMAN. That way they would have a fair comparison between the quality of the person you are proposing to have work on it for 100 hours and the quality of the person that someone else

is proposing to have work on it for 100 hours. And you have no problem with that?

Mr. WILLIAMS. No problem with that.

Senator BINGAMAN. That should be part of what they evaluate.

Mr. WILLIAMS. We certainly agree that cost has to be taken into consideration, but we think that dividing an annual salary by different numbers of hours to come up with an hourly rate gimmick is just that. It is gimmickry.

Senator BINGAMÁN. Just to get it real clear in my mind, you are encouraging DOD to compare the annual compensation of the people who are proposed to work on the project.

Mr. WILLIAMS. Correct.

Senator BINGAMAN. Rather than the hourly wage on a different scale for each contractor?

Mr. WILLIAMS. Yes, sir.

Senator BINGAMAN. Let me just ask on this, and this may be something that we have already gone over, but the awards without discussion proposal—Mr. Fuqua, in your prepared statement you indicate that DOD has been incorrect in its belief that the General Accounting Office requires that an award may be made without discussion only based on the lowest price. GAO seems to support that position in the testimony that they have given us.

The Department's proposal, which we have been given, would eliminate the statutory requirement for discussions with offerors when making an award based upon non-cost factors.

DOD disagrees with GAO's interpretation of its own decision. Could you clarify for us why we need to be legislating in this area? It seems like we are always criticized for micro-managing, yet we are always being asked to do it.

Mr. FUQUA. In our view you probably do not need to legislate. As I pointed out in my testimony, we are aware that there are some discrepancies between the DOD interpretation of what the GAO's interpretation was, as you indicated.

We think the language that Congressman Mavroules has indicated he may include in the House DOD Authorization bill might be something that you would like to look at because we think it is much superior to the section 204 language that is contained in S. 2440. I think that the Mavroules proposal clarifies and identifies the problems that we see with the current situation. I think it will clarify the apparent disagreement between the DOD and the GAO in their interpretations. We think that language in the House bill should merit your review.

Senator BINGAMAN. All right. We had planned to end this hearing about now. I appreciate everybody's willingness to start early today, as we did. I think it has been very useful testimony. We are going to take it; try to digest it; and figure out what we can reasonably try to get accomplished this year by way of legislation.

We appreciate your being here, and we may be back in touch with some of you with additional questions as we go forward.

Thank you all very much. I appreciate it.

[Questions for the record submitted by Senator Bingaman and answers supplied by Mr. Fuqua follow:]

Questions Submitted by Senator Bingaman, Answers Supplied by Mr. Fuqua

Commercial Style Acquisition Practices

1. Mr. Fuqua your testimony indicates that "requirements for submission of cost or pricing data where competition or the availability of relevant sales data makes such disclosures inappropriate" is an impediment to the acquisition of commmerical products. However, the Truth in Negiations Act provides exceptions to contractor disclosure of cost and pricing data where there is "adequate price competition" or where market prices of commercial items sold in substantial quantities to the public are established.

-- Please discuss how these statutory exceptions do not go far enough to enhance the use and acquisition of commercial products?

-- For the record would you provide draft language that addresses your concerns?

1. Answer: While it is true that the Truth in Negotiations Act (TINA) provides exemptions to contractor disclosure of cost and pricing data where there is "adequate price competition", those seeking to provide products to the government must still provide detailed sales data to justify qualifying for this exemption. To fully maximize the potential of commercial style acquisition practices, the requirement to provide such data should be the exception; not the rule. We do not have any language to address this problem at this time.

[Additional information supplied by Mr. Fuqua follows:]

Aerospace Industries Association
Electronic Industries Association
National Security Industrial Association
United States Chamber of Commerce

March 21, 1990

Dr. Allan V. Burman
Administrator
Office of Federal Procurement Policy
Old Executive Office Bldg., #350
Washington, D.C. 20503

Dear Dr. Burman:

We the undersigned are concerned about the cumulative effect of the piecemeal and uncoordinated approach in recent legislation and implementing regulations intended to improve the integrity of the procurement process. These recent initiatives include the following:

Sec. 27 of the Office of Federal Procurement Policy Act (Procurement Integrity - P.L. 100-679);

Sec. 8141 of the Defense Appropriations Act for FY 1989 (Conflict of Interest -- Consulting Services - P.L. 100-463);

Sec. 319, Interior Appropriations Act for FY 1990 (The Byrd Amendment - P.L. 101-121);

Ethics Reform Act of 1989 (P.L. 101-194).

Each of these legislative initiatives was intended as an improvement and a reform of the procurement process. Unfortunately, however, efforts to reform government contracting have imposed redundant and excessive demonstrations of compliance on contractors. As a consequence, the multitude of laws and implementing regulations regarding conduct and integrity in the government marketplace fail to provide contractors with coherent, consistent and understandable guidance for compliance.

Many of the recent initiatives neither recognize nor integrate the significant base of laws, regulations, and case law already in place for many years. New proposals for the most part simply lay down isolated complex directives for obtaining assurances from contractor and government personnel that they are complying with the new law's confusing restatement of previously existing laws and regulations. As a result, government contractors are required to comply with numerous redundant certificates and clauses.

The possibility exists for any given procurement, that a contractor may have to submit not only three new consultant conflict of interest certificates in accordance with OFPP policy, but a certificate of independent price determination, a certificate of lobbying, a lobbying disclosure form, and a certificate of indirect costs that includes coverage of costs already covered by the lobbying certifications and disclosures. In addition, some contractors may be required under Department of Defense interim rules to provide a certificate for competitive awards. Should the now-suspended procurement integrity statute again come into force

(as appears likely), three more types of certification will be necessary.

Each certification is justified by its proponents as necessary to achieve the same goal: ensuring the integrity of a federal procurement. The result for contractors, however, is costly and confusing administrative efforts to demonstrate compliance with usually redundant, frequently contradictory, and almost always complex, unclear and overlapping requirements. More important, the result should never be the criminalization of the federal procurement process through confusing certifications.

It is time for an integrated legislative approach to assure integrity in the government marketplace. Experience in training hundreds of thousands of our employees in the complexities of the new integrity, ethics and lobbying rules has convinced us of the urgent need for an administratively simple, comprehensive, and cost-effective system of assuring integrity in government procurements.

We understand consideration is being given to the consolidation of the so-called "revolving door" statutes. A similar initiative should be undertaken to consolidate statutes and regulations relative to integrity and ethics in government contracting. We urge this consolidation effort be focused on contracting and selling to the government, and not be lumped in with separate efforts to strengthen compliance in other areas, such as federal grant and loan programs. We also urge that studied consideration be given to consolidation and modification of the existing myriad and diverse statutes.

The awarding of grants and loans may indeed require discrete treatment; however, experience with the Byrd Amendment demonstrates that applying a uniform rule to all the various types of federal actions ignores the substantially different attributes of government and contractor activities in contracting. Any effort to consolidate legislation must recognize the critical business relationships existing between government and its contractors and vendors, and must make common sense to the hundreds of thousands of both government and contractor personnel affected.

Clearly the federal government wants to assure unambiguous rules that make federal contracting less adversarial. During these times of budgetary restraint, it is critical that we also attain a more cost-effective and less administratively burdensome approach toward maintaining an unbiased procurement system. The Office of Federal Procurement Policy (OFPP) is the most appropriate organization to lead the development of such a comprehensive approach. We request that you immediately begin with this program of consolidated reform. This will, of course, require involvement by the Office of Management and Budget, the Department of Defense, General Services Administration, the regulatory councils, and Congress.

We are ready to support such an effort, and propose that the industry associations convene a special subcommittee comprised of legal, legislative, and procurement experts tasked to offer a specific proposal for consideration by the executive and legislative branches of our government. In the conduct of this effort, however, we urge that special care be taken to guard against either the intentional or unintentional imposition of requirements not now set forth in either law or regulation.

Subsumed within the context of a comprehensive approach is the need for a special effort to achieve simplicity, clarity, and consistency of that now in being.

Sincerely,

Wallace H. Robinson, Jr.
President
National Security Industrial Association

Jean A. Caffiaux
Sr. Vice President
Electronic Industries Association

Don Fuqua
President
Aerospace Industries Association

Jeffrey H. Joseph
Vice President, Domestic Policy
U.S. Chamber of Commerce

2. Mr. Fuqua in your statement you indicated that there are "serious paperwork and disclosure burdens being imposed on the sale of commercial products."

-- Are any of these burdens the result of existing laws? If so, please discuss the laws which impose the most serious burdens.

2. Answer: The serious paperwork and disclosure burdens imposed on the sale of commercial products have been discussed at length before both this Subcommittee and Senator Levin's Governmental Affairs Oversight of Government Management Subcommittee. Most notable among these are requirements for submission of cost or pricing data and sales data disclosures necessary to meet market price exception criteria under the Truth In Negotiations Act.

There is also a very serious burden imposed upon contractors by the growing number of certification requirements contained in statute. These statutes include TINA, the Byrd Amendment, procurement integrity, the Drug Free Workplace Act, P.L. 95-507, etc.

3. Mr. Fuqua your statement also notes that "section 202 deals with various policy concerns long expressed by executive agencies but it does not address the impediments identified by industry."

-- Please describe those impediments and give us your ideas as to what Congress should do.

3. Answer: Impediments encountered by industry include:
1) excessive and unnecessary cost or pricing data and price and sales data disclosures;
2) technical data rights requirements;
3) flowdown of government terms and conditions;
4) interference with established materiel and components arrangements;
5) interference with manufacturing operations;
6) uncertainty caused by continually changing regulations;
7) requirements for goals for awards to small and small disadvantaged businesses; and
8) ever growing numbers of certifications.

For further information, please see my response to the next question.

4. Mr. Fuqua your statement noted that "the acquisition of commercial products by DoD can best be improved by full implementation of Section 824 of the FY '90 Defense Authorization Act.

-- Gentlemen, what are your views on the need for additional legislation in light of the fact that current authority has not yet been implemented.

4. Answer: In addition to full and prompt regulatory implementation of Section 824 of the fiscal year 1990 Defense Authorization Act, we support enactment of a companion statute to deal with civilian agencies, as proposed by Senators Levin, Glenn, Cohen, and Roth in S. 1957, the "Nondevelopmental Items Acquisition Act of 1989". Such a statute could also be modified to take further steps toward correcting the serious paperwork and disclosure burdens being imposed on the sale of commercial products, including the problem of requirements for submission of cost or pricing data where competition or the availability of relevant sales data makes such disclosures inappropriate. Industry would support a proposal which included: 1) development of a standard form commercial contract; 2) an increased use of functional requirements

rather than design specifications; and 3) an emphasis on the government's use of market research over burdensome and intrusive data disclosure requirements imposed upon commercial products suppliers.

5. The commercial acquisition proposal uses the term "commercial-style buying practices?"

-- What is you understanding of the meaning of this term?

5. Answer: Commercial style buying practices are much more streamlined than processes utilized by the government. Commercial style buying practices do not require the documentation, audit, and oversight that the government currently requires in its acquisition processes. We believe that much of the documentation, audit and oversight does not provide appropriate value for effort expended. In addition, the government should not be in the position of telling a company how to build a commercial product or buy components or raw materials.

The acquisition process would be made less costly with no sacrifice in price or quality by: 1) establishing a small but knowledgable source selection team with direct access to top management for problem resolution and decisionmaking; 2) pre-qualifying suppliers and products based on proven quality, but allowing additional suppliers to compete; 3) clearly establishing source selection criteria and limiting the amount of proposal documentation; 4) relying on the integrity of the suppliers based on past performance and thereby reducing contractor oversight; and 5) minimizing supplier data requirements and reports during contract performance.

6. Under the proposal, Federal agencies may waive virtually all laws to establish "commercial-stvle" procedures.

-- What laws, if any, should not be waived?

6. Answer: We do not believe that the Competition in Contracting Act should be waived. There are adequate exemptions already in existence in the Act that address the necessary circumstances where competition should not be obtained. In addition, we also believe that laws that establish the rights of both parties, such as the Disputes Act should not be waived.

7. In addition to covering "commercial products," the proposal would also permit use of "commercial-style procedures" to waive virtually any law applicable to any weapons system -- no matter how costly or complex -- so long as at least one copy has been "satisfactorily supplied."

-- Can you give an example of a current or recent weapon system which would have been a good candidate for "commercial style procedures" -- and, if so, which laws should have been waived during the acquisition of that system?

7. Answer: We believe that the Long Range Air ASW Capabilities Aircraft (LRAACA) would have been a good candidate for commercial style procedures since one of the competitors was using a commercial aircraft as the platform. Time limitations do not permit the identification of laws that should have been waived. We would suggest a different approach for consideration with regards to commercial products: the government should buy commercial products as a commercial customer would. To accommodate this, we suggest that clear guidance be provided whether in the form of blanket waivers or an acknowledgment that it is in the national interest to buy commercial products. Third, a policy stating that the Contracting Officer has the right

to waive contractual requirements "when the national interest" could authorize waivers in order to procure commercial products. Without such clarifications, the risk of noncompliance with statutory and regulatory requirements is on the contractor and, as DoD is finding out, many commercial contractors are refusing to bid rather than take the risk.

8. Currently, under the Competition in Contracting Act, a solicitation must describe the government's needs in terms of a "function," "performance," or "design requirements." The proposal only requires a "product description."

-- How would this change improve the acquisition of commercial products?

8. Answer: We do not believe the term "product description" necessarily improves the acquisition of commercial products. "Product description" could mean detailed specifications. We would rather see CICA recognize the use of functional and performance specifications.

9. Currently, under the Competition in Contracting Act, the solicitation must include a statement of the relative importance assigned to all evaluation factors. The proposal, however, only requires listing the evaluation factors.

-- How would this change improve the acquisition of commercial products?

9. Answer: As currently drafted, it would not. Industry believes that any change to CICA should recognize the need to identify the relative importance of source selection criteria -- no matter what type of procurement is in progress. Evaluation criteria and their relative weights or range of weights should be identified. The absence of this information permits a great deal of subjectivity to enter the decisionmaking process, obviously compromising it.

10. Question: The proposal authorizes restrictions in competitions through the establishment of a "list of sources." What will be the potential impact of establishing a restricted list of bidders.

Answer: As we understand, it is not DoD's intent to use this authority to limit competition. The word "restricted" in your question connotes or implies that some arbitrary limit may be placed on the number of bidders who will be listed. However, DoD has not used this term. Section 202 of the DMIA provides a two-step process for commercial acquisition under which firms would first be given an opportunity to qualify and be placed on a bidders list; then, when a procurement was actually made, those on the list would be given the opportunity to compete. This would streamline the entire process by ensuring that those who are on the list are qualified suppliers. It would not prevent other potential suppliers from having their names added to the list once they went through a qualification process, but the department would not be required to hold up an ongoing procurement until a particular firm was able to qualify.

The United States is the only country in the free world that does not use qualified manufacturers lists or qualified supplier lists in its procurement process. Rather, it permits full and open competition for all its requirements. Every firm that wishes to compete for government business should have an opportunity to do so, but requiring that they be qualified before they enter a competition would greatly simplify and streamline the acquisition process, eliminate many bid protests, and prevent awards to marginally qualified or unqualified contractors.

11. Question: The proposal authorizes DoD to establish a test bid protest forum that would preempt the bid protest authority of the GAO and the Boards of Contract Appeals. How would you structure such a test to ensure no adverse impact on the quality and fairness of defense acquisitions? Do you support this aspect of the proposal? Why or why not?

Answer: Again, it is our understanding that this test would only apply to commercial acquisitions and is another step towards streamlining such acquisitions. If such bid protest decisions were to be made in DoD, they should be made at a high enough level to ensure objectivity. Depending on the dollar value of the procurement involved, this could be at the head of a procuring activity or a higher level. As to whether we support this proposal, there are some advantages to having a third party like GAO resolve bid protests. However, the current process does cause considerable delay in making award if there is a protest.

Multiyear Contracts

1. **Multiyear contracts provide stability by fixing contract terms over a long period but they also reduce the government's flexibility in the out-years to meet changes in the threat and funding levels. In addition, when a multiyear contract is terminated termination costs must be paid to the contractor.**

-- **In your experience are termination costs for multiyear contracts greater than those for annual contracts for similar items?**

Answer: It is presumed that the question uses the term "termination cost" to cover both cancellation costs and normal termination costs, and my answer is based on this assumption. Termination costs for a multiyear contract would be higher for the out years of the contract than they would be for a single fiscal year contract. This is due to the fact that the contractor and his suppliers will be making expenditures at an earlier time in the contracting cycle in order to generate savings versus a normal fiscal year. The expenditures would be aimed at allowing the achievement of an efficient production rate by both the contractor and his suppliers. Achieving these rates in most cases dictates higher long lead expenditures by both the suppliers and contractor since they will try to maximize large quantity material procurements.

Awards without discussions

1. **Mr. Fuqua, in your statement you indicated that the DoD is incorrect in its belief that the GAO requires that an award may be made without discussions only based on the lowest price. The GAO seemed to support your position when it recently testified before us that "there is nothing in the law or regulation that precludes DoD from placing more emphasis on quality and performance and less on price." As I understand the Department's proposal, it would eliminate the statutory requirement for discussions with offerors when making an award based upon non-cost factors.**

-- **Gentlemen what is your understanding of the basis for the DoD interpretation of the GAO decision?**

We do not understand why DoD has interpreted the GAO decision in the way they have. One possible reason for their interpretation is that they are reluctant to specify evaluation criteria in the solicitation in the detail required by the GAO decision.

-- The terms "lowest overall cost" and "lowest price" are not synonmous. Would you discuss the difference?

Lowest price is simply the lowest bid offered for the instant procurement. Lowest overall cost reflects costs beyond just the initial acquisition price such as maintenance, warranties, quality, performance, anticipated lifecycle, etc.

-- What factors would make it appropriate to conduct discussions in negotiated procurements?

Discussions are appropriate where there are technical or cost uncertainties or the government does not have the ability to adequately specify its requirement. Discussion would also be appropriate where the buying activity anticipates that a wide variance in products will be offered to meet a requirement.

-- Are there generic negotiated procurements for which discussions might be inappropriate? If so, please describe.

not

We do believe that a generic category can be defined where discussions are inappropriate. We believe this decision has to be made on a case by case basis.

Certified cost or pricing data threshold

1. You have both testified in support of raising the threshold for cost and pricing data. Under the proposal, certified cost and pricing data would not be required for contracts under $500,000. Under current procedures, contracting officers do not request pre-award audits for contracts under $500,000.

-- If the threshold is raised, and if pre-award cost and pricing data is not requested, what would serve as the primary incentive for contractors to provide a fair and reasonable price to the government in awards under the the $500,000 threshold?

Answer: I disagree with the implications raised in the question that, but for TINA, contractors would have no incentive to provide fair and reasonable prices to the government for awards below the threshold. Even today, where it applies at all, TINA provides a disclosure of cost data only to the government; a contractor is free to establish its price at any level based on the cost data.

Nevertheless, for most contractors subject to TINA, the mandatory disclosure of certified cost or pricing data is not the only information which the government has available to determine whether a contractor's proposal represents a "fair and reasonable" price.

Certainly the government may have prior price history of its own purchases of that item and it may have its own independent price analysis of the item. Beyond price history, the government has access to a large volume of contractor financial data on a routine basis, including forward pricing rates and interim billing rates.

Furthermore, for many contractors the government routinely undertakes periodic detailed systems reviews of their internal operations, including annual cost accounting standard disclosure reviews, purchasing systems reviews, estimating systems reviews, subcontract management reviews and compensation reviews. Of course, the government's extensive audit rights provide further opportunities to validate contractors' systems.

Finally, a contractor is subjected to a variety of other statutory and regulatory incentives (i.e. sanctions) such as the certificate of indirect costs, the civil and criminal provisions of the False Claims Act, and others.

Based on these factors, and absent an evil intent, we believe the government has more than ample protection and opportunity to ensure that it has a basis for determining whether a contractor's proposal is "fair and reasonable."

2. The Department of Defense has stated that raising the threshold will eliminate the administrative burden associated with the complying with the requirement. The Inspector General has questioned this rationale since the contractor must utilize this data to construct a proposal.

-- Does the compilation and delivery of cost and pricing data to contracting officers impose a burden on a contractor that is significantly greater than that necessitated for compiling the data for purposes of developing the contractor's proposal?

Answer: Absolutely. The information which a contractor needs in order to develop a proposal is different than the "cost or pricing" information which would reasonably be expected to affect price negotiations and which a contractor must compile, "deliver" to the government and then certify to as "current, complete and accurate." The Department's affirmative (and proper) recognition of post-handshake sweeps before the certificate must be signed is proof that information not necessary for a contractor's bid preparation must be disclosed to comply with the law.

The differences may be better explained through two examples, one applicable to contractors and one applicable to the members of this Committee.

When one of our member companies prepares a proposal, it takes into account subcontract offers that it has received, and has had the opportunity to analyze, prior to making its proposal. Yet, under TINA, all subcontractor and vendor quotes which have been received prior to handshake, whether opened or not, whether analyzed or not, whether "rational" or not, are "cost or pricing data" for purposes of compliance with TINA.

As a Senator voting on the floor, you may make the decision on how to vote based on talking to some of your colleagues, based on a memo from your personal office legislative director, and maybe by reading the committee report or Policy Committee memo on the proposal. Certainly with this information and your own experience in knowing what data sources are reliable, you can cast an informed vote.

If an analogous TINA-type requirement were imposed on you, before your vote could count you would have to disclose at a minimum: 1) the names of all of the people you talked to about this vote; 2) all of the drafts of the memos written by your staff or the policy staff to explain the issue (including those that were rejected as being substantively incorrect by your legislative director and including those that were prepared for you but were never sent to you because the legislative assistant was out sick); 3) all of the mail you received on this issue, including the mail received in your state's smallest office just a few minutes before your vote was cast; and 4) all of the telephone calls received concerning this vote, irrespective if their origin were the White House or Lafayette Park.

As you can see, the information necessary to make an informed vote, or to make a fair proposal, varies significantly from the statutory obligations imposed on a contractor under TINA to disclose "all of the facts which would reasonably be expected to affect price negotiations," and then to have the extensive systems in place to capture, record and verify that all such information is "current, complete and accurate."

Pilot program for major defense acquisition programs

1. The pilot program is premised on the belief that current laws inhibit efforts to streamline the acquisition system. In your statement, Mr. Fuqua, you recommended that the proposal be amended to ~~be~~ provide that the waiver of any law or regulation must be consented in by the contractor.

-- Which statutes, if any, have you identified as establishing a significant impediment to efficient and effective acquisition practices?

1. Answer: The Aerospace Research Center of AIA prepared a list of procurement impediments to a viable industrial base in March of 1988. In addition to AIA's listing, other industry associations and independent organizations and academicians have prepared similar lists. The AIA list is submitted with my response.

[A copy of the Aerospace Industries Survey, "Impediments to a Viable Industrial Base", will be retained in committee files.]

Examples that stand out include the following:

- o Statutes which establish independent competition advocates functioning outside the acquisition chain of command: 10 U.S.C. 2317, 2318, 2319.
- o Statutes which establish a presumption in favor of dual sourcing:
- o 10 U.S.C. 2324 (Allowable Costs) causes distortions which could be adjusted with adequate waiver authority.
- o Statutes which support contract financing policies which have imposed very substantial financial risks on contractors without offsetting compensations: 10 U.S.C. 2304, 2324, 2329 and 2365.

2. If established, what criteria and procedures should be used to evaluate the effectiveness of the pilot program?

2. Answer: The Department of Defense has in place sound systems for measuring progress and attainment of identified milestones. Section 217 clearly places a very substantial responsibility on Program Managers and Acquisition Executives to be very active in their management of pilot programs. Program Managers should be asked to detail the expected accomplishments of a pilot program in reduction of time and costs to government and contractor.

3. **Under the proposal the waiver authority does not extend to laws "intended to assure financial integrity for the conduct of government programs."**

-- **What laws, in your view, are "intended to assure financial integrity for the conduct of government programs?"**

3. Answer: Laws relating to the functions of the Defense Contract Audit Agency and the DoD Inspector General, including laws pertaining to the truth or accuracy of required certifications made in submitting bids and proposals, modifications and other contract actions.

4. The GAO recently testified before the Subcommittee that "experience in recent years provides little comfort that existing laws and regulations should be relaxed" as provided for under the pilot program. GAO stated that the Contractor Risk Assessment Guide Program is a better approach towards restoring public confidence and reducing government oversight of the acquisition system.

-- Would you please discuss why more defense contractors have not elected to participate in the Contractor Risk Assessment Guide Program?

-- Can you suggest some actions that the Congress and or the Department can take to increase contractor participation in the Contractor Risk Assessment Guide Program?

4. Answer: AIA membership consists primarily of large, publicly-held companies, many of which have substantial commercially priced business. These companies believe in the need for cost effective internal controls and, generally, have had reasonably effective internal control systems for many years. In addition, our members have implemented improvements to the existing control systems when justified. Notwithstanding the ongoing efforts to improve their internal controls, many companies have reservations about participating in a formalized CRAG program. The reasons for these reservations generally fall into the following categories:

1) Companies are concerned that CRAG will unnecessarily increase their costs. Companies view CRAG as a program designed to reduce the work load for DCAA but not necessarily a reduction in audit effort. For example, having contractors perform DCAA audits and sharing the results with DCAA does not reduce audit oversight; it merely shifts the work (and the expense) to the contractor.

2) Our member companies express concern that DCAA training and evaluation systems do not facilitate effective implementation of CRAG at operating levels. The experience of many contractors indicates that DCAA auditors are more comfortable performing analysis of transactions than in doing systems audits. Even when the auditor performs systems audits there is a tendency for the auditor to try to dictate his or her preferred control rather than evaluation of the existing system to determine the adequacy of its control. In addition, auditors seem to have great difficulty in attesting that things are right. Many contractors believe that the local auditor is motivated to question and disallow costs and will continue to search for issues regardless of the effectiveness of the internal control systems. The semi-annual management information system reports of DCAA activity which concentrates on costs questioned or "saved" reinforces this view.

3) Contractors' efforts to ensure effective implementation of internal control systems are part of their self-governance program. The effectiveness of such a program is dependent upon open communication with individual employees. This was recognized under DII and ground rules were established to protect employee confidentiality. Notwithstanding this, DCAA believes it must have access to all contractor work papers related to reviews of CRAG areas before it can rely on the results of these reviews. Contractors feel that such access would inhibit the openness of employee-employer communications which in turn will dilute the effectiveness of reviews performed to ensure effective implementation of internal control systems.

4) Contractors are concerned about inconsistencies among DCAA auditors in application of the CRAG program.

The following recommendations may allow contractors to view CRAG more favorably:

1. Increase the involvement of the ACO in the CRAG process. We support recent actions by the new DCMC in this direction. Stronger support by ACOs, and OSD policy guidance should result in more unifrom and consistent application of CRAG.

2. Congress should seek ways to evaluate the performance of DCAA which focus on broader performance measures rather than costs allegedly saved per auditor or audit dollar. Congress should recognize the limitation of this unit of measure. Congress needs to encourage DCAA in ways which will reduce audit effort and audit support costs of contractors as well as DCAA.

3. DCAA training should emphasize systems audits and application of reasonable materiality considerations. DCAA's overall audit goals must be redirected from "less cost to the government" to proper and equitable contract costing.

4. The DoD should adopt measures which simplify compliance as presented by indsutry in its DMR input including: SPICE, increased use of sampling for measruement of unallowable costs, the modification of the indirect cost certification, and use of advance agreements.

5. The DoD should demonstrate its willingess to pay its fair share of a contractor's costs and remove incentives for DCAA auditors to try to maximize cost disallowances.

Lastly, we would like to indicate our disagreement with GAO's testimony regarding the DMIA pilot program that "experience in recent years provides little comfort that existing laws and regulations should be relaxed." We believe recent experience has demonstrated that contractor self-governance programs are effective and that most contractors have established internal controls which provide reasonable assurance of regulatory compliance and ethical business practices.

**5. At that same hearing the GAO also testified that "Defense Enterprise Programs and other Defense Management Report initiatives offer DoD an oportunity to address many well-recognized defense acquisition problems."**

**-- From your perspective, why hasn't DoD made greater use of the Defense Enterprise Programs authority?**

**5. Answer: The Defense Enterprise Program, I believe, simply has not been adequate.**

Questions Submitted by Senator Bingaman, Answers supplied by Mr, DeHaven

Commercial style acquisition practices

1. Testimony indicates that "requirements for submission of cost or pricing data where competition or the availability of relevant sales data makes such disclosures inappropriate" is an impediment to the acquisition of commercial products. However, the Truth in Negations Act provides exceptions to contractor disclosure of cost and pricing data where there is "adequate price competition" or where market prices of commercial items sold in substantial quantities to the public are established.

-- Please discuss how these statutory exceptions do not go far enough to enhance the use and acquisition of commercial products?

**RESPONSE:**

We believe that the current statutory exceptions provide the appropriate framework for enhancing the use and acquisition of commercial products. However, the regulatory and policy implementation of those exceptions have the opposite effect. Instead of encouraging the use of the exceptions provided in the statute, the regulatory and policy implementation attempts to minimize the applicability of the exceptions and create excessive paperwork burdens for contractors in order to seek the use of the exceptions.

For example, the adequate price competition exception is often just ignored in negotiated procurements -- even when agencies have otherwise determined that the competition is a "full and open competition" -- and even though the regulations say that there is a presumption that adequate price competition exists in most procurements when there are two or more offerors. In addition, the "commercial items sold in substantial quantities" exception is written in regulation and policy statements to require extremely narrow tests to be applied to obtain the exception and require vendors to generate incredible amounts of paperwork to claim the exemption, and have the systems necessary to do so. We note that these systems are required for no other reason than to generate the required data.

This unfortunately typical overregulation and overinterpretation is especially counterproductive in commercial product procurements. It also demonstrates a lack of understanding of how the commercial marketplace works and an inexplicable reluctance to rely upon the forces of the competitive commercial marketplace to assure fair and reasonable prices -- despite Congress' clearly expressed recognition of and willingness to do so.

-- For the record would you provide draft language that addresses your concerns?

**RESPONSE:**

We would be pleased to do so and will provide the draft language under separate cover next week.

2. Industry indicates that there are "serious paperwork and disclosure burdens being imposed in the sale of commercial products."

-- Are any of these burdens the result of existing laws? If so, please discuss the laws which impose the most serious burdens.

**RESPONSE:**

As discussed in our responses to number 1 above, we believe the current burdens can be attributed to regulatory and policy implementation, not the relevant statutes themselves. However, we also believe that legislation may be necessary to correct the current regulatory and policy situation.

3. The statement also notes that "section 202 deals with various policy concerns long expressed by executive agencies but it does not address the impediments identified by industry."

-- Please describe those impediments and give us your ideas as to what Congress should do.

**RESPONSE:**

Industry, the Packard Commission, the earlier Commission on Government Procurement, and OMB's own January 1990 report on paperwork burdens in federal procurement, have all consistently identified extraneous and excessive information disclosures, related certifications, demands for technical data rights and cost and pricing data as being among the most serious impediments to the acquisition of commercial products. In contrast, Executive agencies have often identified full and open competition, the GSA Board of Contract Appeals, the conduct of negotiations and discussions, and the revelation of procurement evaluation criteria as the impediments to improved procurement of commercial products. Sections 202 and 204 provides a package of relief provisions for this latter set of complaints. Industry has previously expressed strong disagreement with such a viewpoint, and reiterates that concern today.

Commercial product companies have to compete every day. Indeed, the domestic and world marketplace is by its nature an environment of intense competition. That is the world in which we normally conduct business. Commercial industry is not seeking relief from full, fair and open competition in the federal marketplace. However, Section 202 would significantly circumscribe the fullness and openness of competition in the federal market. Over time OFPP has alternatively described Section 202 as a "substitute" for CICA or stated that Section 202 "supersedes CICA", making a distinction between these two characterizations. We believe this is a distinction without a difference; Section 202 would be a major setback for CICA, and we oppose its enactment.

We believe that the excessive, constant demands for cost, pricing and sales data by the federal procurement bureaucracy is counterproductive to the policy standard of competition, which represents the government's best protection and assurance. We further believe that this is in no small part due to a regulatory gap which exists between the respective FAR implementations of TINA and CICA. The regulatory disconnect between the standards of "adequate price competition" from TINA and "full and open competition" from CICA, is a significant contributor to this ongoing problem. Congressman Frank Horton identified this specific problem earlier this year and offered a statutory proposal

to directly deal with that issue. We strongly recommend the Horton initiative for your serious consideration.

Moreover, the Horton proposal addressed several other major impediments to enhanced commercial product acquisition, including:

-- Today's near total absence of market research in the federal procurement process; and,

-- The intrusive and damaging effect of requirements for sweeping data disclosures, such as GSA's Multiple Award Schedules Policy, which affects government-wide commercial products acquisition.

We believe that reforms along the lines of S.1957 and the Horton initiative, taken together, would constitute truly landmark reform. Such appropriately focused change would make a constructive and meaningful difference in commercial product acquisition, rather than pursuing the concepts embodied in Section 202.

4. Mr. Fuqua's statement noted that "the acquisition of commercial products by DoD can best be improved by full implementation of Section 824 of the FY '90 Defense Authorization Act."

-- Gentlemen, what are your views on the need for additional legislation in light of the fact that current authority has not yet been implemented.

**RESPONSE:**

The procurement bureaucracy's approach to implementing last year's Section 824 has been unenthusiastic at best. Initial drafts of the implementing regulations contained as many damaging new provisions which would set back the acquisition process, as legitimate reforms. Since those early drafts DoD and GSA have been engaged in a long debate on which of the new, restrictive requirements should be adopted, including new price reduction clause requirements, new defective pricing requirements, and broadened data disclosure requirements tied to SF-1412's (which was originally designed to be an exemption from sweeping data disclosures). In all of this we are troubled that executive branch leadership and guidance has yet to be asserted. OFPP has the statutory charge to provide such leadership, including through the mechanism of the FAR Council.

We conclude that further Congressional direction is clearly necessary. Moreover, the Frank Horton proposal, if adopted, would deal with several key systemic problems which Section 824 did not address.

Finally, we urge the Congress to direct the rigorous implementation of a broad new education effort, retraining existing procurement personnel, including the procurement regulators, in the fundamental reform principals promulgated by Congress. A major initiative of this sort is imperative if cultural change is to ever take place in the federal procurement bureaucracy.

5. The commercial acquisition proposal uses the term "commercial-style buying practices?"

-- What is your understanding of the meaning of this term?

**RESPONSE:**

Because the Customer in this case is the Government of the United States, all parties to the procurement process require special protections in the process. The taxpayer, the government end-user and the vendor community each need and properly benefit from the protections enacted over the past 25 years. As such, the government cannot set aside its character and responsibilities as the public protector, the sovereign, and somehow pose itself as merely being a private corporation. Therefore, "commercial practices" in this context does not and cannot literally mean doing business the way private firms and individuals do.

However, there are certain fundamental commercial practices which the government can and should adopt, and which we believe will require Congressional direction to achieve.

The centerpiece of these commercial practices relates to the institution of genuine market research so that the government can become an informed buyer rather than continuing to rely on vendor certifications of intrusive proprietary data. Indeed, we believe that this sort of market orientation, including other commercial practices such as price analysis, comparative market analysis, and other such techniques, would result in a dramatic reduction in paperwork burden. We believe that is the most important commercial practice of all. We do not see that sort of policy movement, nor do we see Section 202 as a step in that direction. Once again, S.1957 taken together with the Hordon initiative would represent meaningful Congressional direction in this area.

6. Under the proposal, Federal agencies may waive virtually all laws to establish "commercial-style" procedures.

-- What laws, if any, should not be waived?

**RESPONSE:**

Laws which should not be waived are those laws which are not genuine impediments to the procurement process or to the use and acquisition of commercial products, nor should laws be waived which provide necessary assurances of the integrity of procurements. Such statutes which must be retained include at a minimum the following laws:

- the Competition in Contracting Act;

- The Brooks Act;

- any laws establishing socio-economic or preference programs;

- the Paperwork Reduction Act or any other Act which constrains the government's ability to put unnecessary and burdensome paperwork or other requirements on contractors; and,

- any laws, including those portions of the Competition in Contracting Act and the Brooks Act, which provide for the current GSBCA and GAO protest authority.

8. Currently, under the Competition in Contracting Act, a solicitation must describe the government's needs in terms of a "function," "performance," or "design requirements." The proposal only requires a "product description."

-- How would this change improve the acquisition of commercial products?

**RESPONSE:**

We do not believe that this change improves the use or acquisition of commercial products, nor is it of benefit to the taxpayer.

9. Currently, under the Competition in Contracting Act, the solicitation must include a statement of the relative importance assigned to all evaluation factors. The proposal, however, only requires listing the evaluation factors.

-- How would this change improve the acquisition of commercial products?

**RESPONSE:**

We believe that the CICA requirements in this area should be strengthened, not eliminated. Agencies should be required to state all evaluation factors and subfactors and their relative weight and order in detail in solicitations. Without such a requirement, there is no assurance that the government obtains the solution which best satisfies the government's needs at the lowest overall cost. Similarly, the absence of the factors, subfactors and relative significance eliminates a fundamental protection that assures competition.

10. The proposal authorizes restrictions in competition through the establishment of a "list of sources."

-- What will be the potential impact of establishing a restricted list of bidders?

**RESPONSE:**

This proposal is founded on a misguided notion that commercial companies do not seek or use competition in their buying practices. Nothing could be further from the truth. In fact, if commercial companies engaged in the type of practices this proposal attempts to invoke, commercial companies would very likely be subject to shareholder lawsuits for waste and breach of fiduciary duties, and antitrust lawsuits for "market allocation," "boycott" and similar antitrust violations.

11. The proposal authorizes DoD to establish a test bid protest form that would preempt the bid protest authority of the GAO and the Boards of Contract Appeals.

-- How would you structure such a test to ensure no adverse impact on the quality and fairness of defense acquisitions?

-- Do you support this aspect of the proposal? Why or why not?

**RESPONSE:**

Industry does not recommend changing the role or authority of the GSA Board of Contract Appeals. No pilot test of reducing their role or authority is appropriate. The GSBCA is a critical locus of integrity and balance in the system.

Pilot program for major defense acquisition programs

1. The pilot program is premised on the belief that current laws inhibit efforts to streamline the acquisition system. In your statement, Mr. Fuqua, you recommended that the proposal be amended to to provide that the waiver of any law or regulation must be consented in by the contractor.

-- Which statutes, if any, have you identified as establishing a significant impediment to efficient and effective acquisition practices?

**RESPONSE:**

We believe that the root of the current impediment to efficient and effective acquisition practices lies in the regulatory and policy implementation, not the relevant statutes themselves. We are disappointed with DoD's failure to issue draft regulations required by Section 824 of last year's DoD authorization bill. Congress should respond to this course of action by giving clear new direction with accompanying rigorous oversight.

We also believe that it would be helpful for DoD to provide some clearly articulated definitions, criteria and proposed guidance for the applicability of such authority.

Finally, Section 217 must not apply to the acquisition of commercial products in any way.

Awards without discussions

1. In Mr. Fuqua's statement he indicated that the DoD is incorrect in its belief that the GAO requires that an award may be made without discussions only based on the lowest price. The GAO seemed to support this position when it recently testified before us that "there is nothing in the law or regulation that precludes DoD from placing more emphasis on quality and performance and less on price." As I understand the Department's proposal, it would eliminate the statutory requirement for discussions with offerors when making an award based upon non-cost factors.

-- Gentlemen what is your understanding of the basis for the DoD interpretation of the GAO decision?

-- The terms "lowest overall cost" and "lowest price" are not synonymous. Would you discuss the difference?

-- What factors would make it appropriate to conduct discussions in negotiated procurements?

-- Are there generic negotiated procurements for which discussions might be inappropriate? If so, please describe.

**RESPONSE:**

DoD has misinterpreted the GAO decision, as we believe a reading of the case makes clear.

Lowest price refers to the instant price offered in a bid or proposal. Lowest overall cost refers to a comprehensive and balanced evaluation of all indentified factors which can bear on the total cost of an acquisition over its life. This latter category includes all life cycle costs, quality, maintenance and services, and any other relevant category which can have a cost impact over time.

We further believe that the concept of a negotiated procurement without discussions is an oxymoron. We believe that in all but the most basic commodity acquisitions, discussions are both constructive and appropriate.

Commodity procurements without discussions are called IFB's (Invitations For Bids) and are sealed. Discussions would violate the integrity of the process.

Any serious consideration of such a proposal would require the addition of significant new safeguards to protect the integrity and effectiveness of the process.

Certified cost or pricing data threshold

1. You have both testified in support of raising the threshold for cost and pricing data. Under the proposal, certified cost and pricing data would not be required for contracts under $500,000. Under current procedures, contracting officers do not request pre-award audits for contracts under $500,000.

-- If the threshold is raised, and if pre-award cost and pricing data is not requested, what would serve as the primary incentive for contractors to provide a fair and reasonable price to the government in awards under the $500,000 threshold?

**RESPONSE:**

We disagree with the implication of the question that, but for TINA, contractors have no incentive to provide fair and reasonable prices to the government for awards below the threshold.

For most contractors subject to TINA, the mandatory disclosure of certified cost or pricing data is <u>not</u> the only information which the government has available to determine whether a contractor's proposal represents a "fair and reasonable" price.

Whether or not a contractor executes a Certificate of Current Cost or Pricing Data, the negotiation process is a common method the contracting officer uses in arriving at a fair and reasonable price on any particular proposal. Under this process, a detailed cost breakdown by elements of costs is required to be provided with the Contractors' price proposal. This proposal, with its cost back-up, is reviewed and analyzed by the contracting officer.

Certainly the Government may have prior price history of its own purchases of that item and it may have its own independent price analysis of the item. Beyond price history, the government has access to a large volume of contractor financial data on a routine basis, including forward pricing rates and interim billing rates. Depending on the size and complexity of the solicitation, other experts in the organization, such as Price/Cost Analysis, Program Manager, Engineer, and other support organizations as required, will also review and comment on the reasonableness of the estimate.

Based upon the facts and opinions derived from these reviews, the contracting officer then enters into a negotiation with the contractor. This process should result in a fair and reasonable price for the Government and contractor as well.

Furthermore, for many contractors, the Government routinely undertakes periodic detailed systems reviews of contractors' internal operations, including annual cost accounting standard disclosure reviews, purchasing systems reviews, estimating systems reviews, subcontract management reviews and compensation reviews. Of course, the Government's extensive audit rights provides further opportunity to validate the contractor's systems.

A contractor is also subject to a variety of other statutory and regulatory incentives (i.e. sanctions) such as the certificate of indirect costs, the civil and criminal False Claims Act, and others.

Commercial companies selling to the federal government have some additional difficulties with the low cost or pricing data threshold. The compilation of cost and pricing data involves using techniques and methodologies which have no relevance or bearing on how commercial products are priced. Cost or pricing data requires companies to maintain "two sets of books," one based on an arcane set of requirements which has no practical or market relevance, i.e., books, records, systems and resources with expertise to be able, when necessary, to generate cost or pricing data or information necessary to claim an exemption; and the other real set of books is based on the way a competitive commercial company actually approaches the market and thus prices its products and services.

One simply has no meaningful relevance to the other. Competitive commercial companies neither price, manage nor have any practical utility for cost or pricing data information -- except that it is currently required to obtain federal business. It presents an unreal picture which should be irrelevant for government purposes as well.

In situations where the government cannot, for whatever reason, obtain full and open competition for a commercial product, then the government should look to other "market based" comparisons to determine the reasonableness of price. This would include comparisons to other competitive federal price arrangements for the same or similar products, and comparisons to prices available in the commercial marketplace. This should be done, as it is in commercial companies, by the buyer doing the necessary market research as opposed to unwarranted transferral of this responsibility to the vendor by imposing burdensome paperwork. In short, the government as a buying consumer must accept some degree of its own responsibility for becoming an informed buyer.

Many billions of dollars worth of contracts are bid and awarded by industry and state and local governments every year without obtaining cost data or doing audits. Is it considered that such governments are paying "unreasonable" prices? Or that getting cost data necessarily results in reasonable prices, all factors considered?

Finally, contracting officers can get certified cost or pricing data below the 28 year-old $100,000 threshold today through the FAR when they need it; this would be true for under $500,000 if the threshold were raised.

2. The Department of Defense has stated that raising the threshold will eliminate the administrative burden associated with the complying with the requirement. The Inspector General has questioned this rationale since the contractor must utilize this data to construct a proposal.

-- Does the compilation and delivery of cost and pricing data to contracting officers impose a burden on a contractor that is significantly greater than that necessitated for compiling the data for purposes of developing the contractor's proposal?

**RESPONSE:**

[Note: We have also supplied a point-by-point response to the Committee on why the IG has taken the wrong position on this issue. Our testimony on the subject also highlights some of the specific problems we have the IG's position].

Absolutely. We could not disagree more strongly with the IG on this point. The information which a contractor needs in order to develop a proposal is different than the "cost or pricing" information which would reasonably be expected to affect price negotiations which a contractor must compile, "deliver" to the government and then certify to as "current, complete and accurate."

The following are areas of additional costs being incurred by contractors as a result of the requirement to execute the Certificate of Current Cost or Pricing Data:

-- creating a system to track all this information and ensure it is "current, accurate and complete" (while costs will vary significantly based upon size and nature of the company, one AEA member estimated that it cost $2 million to set up its system);

-- added effort of compiling cost data at a level of detail not otherwise required to prepare and submit a responsive proposal;

-- the addition of special reviews prior to the submittal of the proposal that not only add significantly to the proposal cost, but are time consuming in a time limited environment;

-- "sweeps" conducted after the conclusion of negotiations and prior to the execution of the Certificate of Certified Cost or Pricing Data;

-- increased record retention expenses because of the additional records;

-- professional services, attorneys, accountants...etc.

Perhaps the best way to explain the burden of compiling certified cost or pricing information is an example -- an example applicable to the members of the Committee.

When a Senator votes on the floor, you may make the decision on how to vote based on talking to some of your colleagues, based on a memo from your personal office legislative director, and maybe by reading the committee report or Policy Committee memo on the proposal. Certainly with this information and your own experience in knowing what data sources are reliable, you can cast an informed vote.

If an analogous TINA-type requirement were imposed on you, before your vote could count you would have to disclose at a minimum:

-- the names of all of the people with whom you talked about this vote;

-- all of the drafts of the memos written by your staff or the policy staff to explain the issue (including those that were rejected as being substantively incorrect by your legislative director and including those that were prepared for your but never sent to you because the LA was out sick);

-- all of the mail you received on this issue, including the mail received in your state's smallest office just a few minutes before your vote was cast; and,

-- all of the telephone calls received concerning this vote, irrespective if it was from the President of the United States or a homeless person.

Of course, you would also need to design and set-up some form of computer information system so that you could efficiently track, modify, and cross-reference all this information.

It should be noted that not only industry has come to the conclusion that there is an enormous paperwork burden associated with the low threshold that goes above and beyond what a company would do normally to price its products accurately. A recent report to Congress from the Office of Federal Procurement Policy entitled "Federal Procurement Paperwork Burden" noted that, "The expense of compiling cost or pricing data at the level of detail and in accordance with government cost accounting standards can be substantial. Certification of data requires contractors to exercise a high degree of care...and often requires them to employ specialized legal and accounting assistance, thereby further increasing costs."

Questions Submitted by Senator Bingaman, Answers Supplied by

Mr. Willims

**MANDATORY UNCOMPENSATED OVERTIME**

Q. Should Congress legislate further in this area before the effectiveness of the DOD's administrative action has been assessed?

A. Yes, additional legislation is required at this time to effectively stop the practice of mandatory uncompensated overtime. Although the Department of Defense (DOD) issued a policy memorandum signed by the Deputy Under Secretary for Acquisition emphasizing quality factors over cost factors in the acquisition of professional and technical services, this policy primarily addresses the much broader procurement issue of ensuring that the government receives the best value at fair and reasonable prices. This policy memorandum, if implemented properly throughout DOD, could result in improvement in the methodology used in the evaluation and award of professional and technical services contracts.

However, the policy memorandum lacks the prestige and authority of a policy directive issued directly by the Secretary of Defense and is viewed as a technical acquisition matter. In addition, it does not deal with the specific issue of mandatory uncompensated overtime directly and in an effective manner, a point which the industry representatives to the DOD-Industry Advisory Committee made time and time again. Despite continued efforts on the part of these industry representatives during the Advisory Committee deliberations to convince DOD to address directly the mandatory uncompensated overtime problem (i.e., evaluation of proposals for professional and technical services on a 40-hour workweek basis), these efforts were unsuccessful. Short of DOD changing its position and agreeing to issue a regulation implementing evaluation of professional and technical services proposals on a 40-hour workweek basis, we are firmly convinced that legislation is required to solve the mandatory uncompensated overtime problem. The Pell Bill (S. 2239) and the Machtley Bill (H.R. 3651) provide an appropriate legislative solution.

Q. There are numerous groups of employees that are not exempt from the Fair Labor Standards Act. How are professional and technical services employees any different than these other groups?

A. Those groups of employees who are subject to the Fair Labor Standards Act generally are "non-exempt" personnel, who also are subject to the Service Contract Act, where precise hourly wage rates and benefits are prescribed by the Department of Labor. In contrast, professional and technical services employees generally are "exempt" from coverage under either Act. These professional employees are salaried personnel, who work in professional, administrative or executive fields, and have the ability to exercise discretion and independent judgment in performing their jobs. They tend to have college degrees and/or many years of hands-on experience with complex systems and equipments. Their work normally involves a high level of intellectual content.

These exempt professional personnel, comprising a large portion of the labor cost involved in government contracts for professional and technical services, are the ones being victimized by mandatory uncompensated overtime. Once a company wins a contract based on a proposal that includes mandatory uncompensated overtime as the basis for establishing labor costs, its employees are forced to work the extra hours proposed without

additional compensation. Mandating that personnel, exempt from the Fair Labor Standards Act and the Service Contract Act, work in excess of 40 hours a week in fulfilling a government contract runs contrary to established national labor policies and violates both the intent and spirit of OMB Policy Letter No. 78-2 "Preventing Wage Busting for Professionals," dated March 29, 1978, as implemented in the Federal Acquisition Regulation (22.1101 et seq.). Extending the workweek without additional compensation is the most current version of wage busting.

Q. What actions can industry take to police itself against the practice of uncompensated overtime?

A. A variety of practices in the marketplace may suggest the need for a trade association to regulate the business practices of its members. What can be done, aside from a grant of statutory authority, is controlled by the antitrust laws. The litigated cases have consistently held that laudable goals, whether to benefit the industry or the public, do not justify illegal means. Accordingly, an attempt at self-regulation that violates the Sherman Act or the Federal Trade Commission Act is no less a violation because it is undertaken to address an objectionable practice.

More specifically, an industry effort to prohibit mandatory uncompensated overtime, whatever form it may take, creates two antitrust problems. If coercion is used to force adherence, the action may effect a boycott. Without coercion, the action may itself constitute an illegal agreement. As a consequence, the industry is not in a position to engage in self regulation.

Q. Will the government's cost realism analysis uncover instances of contractor's bidding on the basis of uncompensated overtime?

A. The government's cost realism analysis will not necessarily uncover instances of a contractor's bidding on the basis of mandatory uncompensated overtime. First, it must be remembered that a cost realism analysis is not done on all types of contracts. It almost always is done on cost-reimbursement type contracts, but less frequently on time and materials and fixed-price type contracts.

Second, mandatory uncompensated overtime can involve some complex accounting transactions. For example, the impact of mandatory uncompensated overtime can be incorporated into cost/price proposals as a reduction in hourly wage rates or as a reduction in any number of indirect cost pools. Such adjustments to indirect cost pools are not always readily visible to the government simply from a review of the cost or pricing information that is provided by an offeror. Customarily, the Defense Contract Audit Agency (DCAA) is called upon to perform a detailed audit or review of an offeror's proposal in order to uncover the use of mandatory uncompensated overtime.

Q. What options are available to the contracting officer when a cost realism analysis uncovers proposals that are based on uncompensated overtime?

A. The most useful option available to the contracting officer when a cost realism analysis uncovers proposals that are based on mandatory uncompensated overtime is to use the "normalization" process.

The reason for normalizing bids containing mandatory uncompensated overtime to a 40-hour standard is to establish a comparable basis for cost realism

evaluations. The process for normalizing bids requires that the number of person-hours per week in excess of 40 hours be determined either through information supplied by the offeror in the proposal and/or through DCAA rate verification. Once this determination is made, costs can be converted (i.e., normalized) to a 40-hour basis by multiplying the cost by the factor that results from dividing the number of hours-per-week bid, by 40 hours. For example, if the contractor's proposal is based on 45 hours per week, the normalization factor derived is 45/40 = 1.125. This factor then is multiplied by proposed costs including applicable burden.

There is precedent in government procurement for using this normalization method. In the continuing controversy over mandatory uncompensated overtime, several cases have come before the General Accounting Office (GAO). The most notable case, thus far, was brought by Advanced Technology, Inc. but, subsequently, was withdrawn and never ruled on by the GAO (B-224439.1). Based on the GAO decision in a Lockheed case (B-173677), the government's right to normalize costs for evaluation purposes is well-documented. In addition, in the Hardman case (B-224551), GAO also determined that the normalization method for cost realism evaluations is proper and reasonable. In this case, a factor similar to the one described above was used.

The application of the normalization process is a straightforward calculation. No time loss or additional expense in the procurement process should result. Further, based on the implementation of the normalization process, it is fully expected that the number of companies using mandatory uncompensated overtime would decline and, with this decline in usage, there would be an associated decline in the need to normalize cost proposals in the cost realism evaluation process.

In addition, the normalization methodology does not require any regulatory change with respect to the current Federal Acquisition Regulation (FAR) or the Defense Federal Acquisition Regulation Supplement (DFARS) policies. FAR Subpart 15.608 requires the contracting officer to use cost or price analysis to determine reasonableness of cost, as well as to determine the offeror's understanding of the work and ability to perform.

Furthermore, the normalization process has no impact on companies that use full-time accounting systems. Such companies would construct their cost proposals in accordance with their DCAA-approved estimating systems and disclosed accounting practices. An evaluation process which normalizes cost proposals containing mandatory uncompensated overtime to a 40-hour workweek basis does not require any changes in the cost estimating systems used in preparing cost proposals. With respect to contractors using a standard 40-hour time-keeping system, their respective cost proposals are based on 40-hour workweeks and would not require any normalization adjustments for evaluation purposes.

Q. If we mandate evaluation on the basis of a 40-hour workweek, what will stop competition from cutting wages to be more competitive?

A. If evaluation on the basis of a 40-hour workweek is mandated by law, there is the possibility that some companies will attempt to cut wages to be more competitive. In our view, however, this possibility is less insidious than reducing a worker's real salary per staff hour based on a requirement for an increased workweek, with no additional compensation or with compensation at a rate less than the worker's normal hourly rate.

When companies attempt to reduce directly wages, the worker is party to the agreement and has the option of declining the job for the rate of pay offered. In contrast, in the case of mandatory uncompensated overtime, the worker often is retained on the basis of an agreed annual salary and only later, at some point in time, is informed of the requirement that he or she must work a workweek of 45, 50, 55, or even 60 hours per week in order to make his or her "full" weekly or annual salary.

The latter does not appear, in our view, to be a practice which the U.S. Government should condone and, in fact, the government has taken regulatory action, in the form of FAR clauses, to identify and prevent this practice. These clauses include:

- FAR 22.1101 Professional Employee Compensation - Applicability:

Summary: Implements OFPP Policy Letter No. 78-2, Preventing "Wage Busting" for Professionals. Expressly states in part, as follows: "The Office of Federal Procurement Policy issued Letter No. 78-2, dated March 29, 1978, Preventing 'Wage Busting' for Professionals. This subpart implements that policy letter. Its application is limited to professional employees."

- FAR 22.1102 Definition of Professional Employee:

Summary: "Professional Employee" means any person meeting the definition of 'employee employed in a bona fide...professional capacity' given in 29 CFR 541. The term embraces members of those professional having a recognized status based upon acquiring professional knowledge through prolonged study. Examples of these professions include accountancy, actuarial computation, architecture, dentistry, engineering, law, medicine, nursing, pharmacy, the sciences (such as biology, chemistry, and physics), and teaching. To be a professional employee, a person must not only be a professional but must be involved essentially in discharging professional duties."

- FAR 22.1103 Policy, Procedures, and Solicitation Provisions:

Summary: "All professional employees shall be compensated fairly and properly. Accordingly, the contracting officer shall insert the provision at 52.222-45, Notice of Compensation for Professional Employees, and 52.222-46, Evaluation of Compensation for Professional Employees, in solicitations for negotiated service contracts when the contract amount is expected to exceed $250,000 and the service to be provided will require meaningful numbers of professional employees. These provisions require that offerors submit for evaluation a total compensation plan setting forth proposed salaries and fringe benefits for professional employees working on the contract. Supporting information will include data, such as recognized national and regional compensation surveys and studies of professional, public and private organizations, used in establishing the total compensation structure. Plans indicating unrealistically low professional employees compensation may be assessed adversely as one of the factors considered in making the award." (See 52.222-45 and 52.222-46 supra; emphasis added.)

- FAR 52.222-45 Notice of Compensation for Professional Employees:

Summary: Provides that "failure to comply with these provisions [evaluation of compensation for professional employees as set forth in 52.222-46 (infra)] may constitute sufficient cause to justify rejection of a proposal. The total compensation plan required to be submitted by the offeror will be viewed as being within the purview of Public Law 87-653 (10 U.S.C. 2306(f) infra) and in accordance with Federal Acquisition Regulation 15.802(a) (supra)." (Emphasis added.)

- FAR 52.222-46 Evaluation of Compensation for Professional Employees:

Summary: 52.222-46 provides "Recompetition of service contracts may in some cases result in lowering the compensation (salaries and fringe benefits) paid or furnished professional employees. This lowering can be detrimental in obtaining the quality of professional services needed for adequate contract performance. It is, therefore, in the government's best interest that professional employees, as defined in 29 CFR 541, be properly and fairly compensated. ...The government will evaluate the [compensation]

plan to assure that it reflects a sound management approach and understanding of the contract requirements. This evaluation will include an assessment of the offeror's ability to provide uninterrupted high-quality work." (emphasis added.)

Companies in the professional and technical services industry who attempt to improve their competitive posture by cutting the salaries of professional employees soon will find this practice working against them in the competitive evaluation and award process.

Q. Will this problem be as significant if DOD uses the new Master Agreement authority to buy services on a "product" basis rather than simply buying "hours?"

A. The Master Agreement authority will not solve the mandatory uncompensated overtime problem. The government currently has the ability to contract on a completion ("product") basis rather than on an "hours" basis. However, in order to contract on a completion basis, the end products must be definable at the time the contract is awarded. When buying professional and technical services (i.e., "brain power"), oftentimes the answer to the question or the solution to the problem is not known in advance. Many times, the tasks to be performed are so complex that the full extent of the problem is not known when the contract is let. This is the most significant difference between acquiring hardware, where the specification is well-defined at the outset, and acquiring professional and technical services, where there is no defined specification.

One other problem with utilizing the completion or "product" format to eliminate mandatory uncompensated overtime is that, in practice, it will not eliminate mandatory uncompensated overtime. Many contracting officers are forced today to issue large, multi-year task order contracts that include very generic statements of work, with specific tasks to be assigned at a later point in time. In the source-selection process for these types of contracts, the contracting officer must rely heavily upon the analysis of labor rates that will be included in the ultimate contract for the purpose of pricing and negotiating task orders with specific statements of work. Even though the ultimate task order may be completion or product-related, the basis upon which the offeror is selected is influenced heavily by his or her rate per hour for a category of labor. In our view, the issuance of product-oriented or completion-type contracts, therefore, will not eliminate the practice of mandatory uncompensated overtime. Moreover, we believe that the government presently is optimizing its use of completion-type contracts.

Therefore, a legislative mandate to evaluate professional and technical services proposals on a 40-hour basis is the only reasonable solution to the mandatory uncompensated overtime problem.

## AWARDS WITHOUT DISCUSSION

Q. Gentlemen, what is your understanding of the basis for the DOD interpretation of the GAO decision?

A. The seminal GAO decision regarding the issue of awards without discussion is the Pan Am Support Services, Inc. decision (B-225964.2). This bid protest and subsequent GAO decision involved a Department of the Army contract award. In the Pan Am decision, GAO held that:

- "Prior decision holding that the Competition in Contracting Act of 1984 prohibits contracting agencies conducting a negotiated procurement

from making an award on the basis of initial proposals without discussions to other than the 'lowest overall cost' offeror where there would be at least one lower-priced proposal within the competitive range is affirmed. The statutory language clearly precludes the making of discretionary cost/technical tradeoffs before discussions are held by requiring the selection of the most favorable initial proposal which is lowest in terms of cost and cost-related factors specified in the solicitation." (emphasis added.)

- "However, cost/technical tradeoffs cannot be utilized in situations where award is to be made on the basis of initial proposals without discussions because the statutory language, which requires selection of the 'lowest overall cost' offeror, clearly precludes such judgmental determinations." (emphasis added.)

It is clear from the GAO decision in the Pan Am case that DOD cannot select a proposal that offers higher technical quality at a higher price without first conducting discussions with all offerors in the competitive range.

Q. The terms "lowest overall cost" and "lowest price" are not synonymous. Would you discuss the difference?

A. It also is clear from the Pan Am decision that GAO considers the terms "lowest overall cost" and "lowest price" to be synonymous. Despite the fact that the Competition in Contracting Act specifically references the term "lowest overall cost," GAO, in its Pan Am decision, repeatedly uses the terms "lowest price" and "lower-priced." This apparent interchangability of terms is evidenced by the following three excerpts from the Pan Am decision:

- "Prior decision holding that the Competition in Contracting Act of 1984 prohibits contracting agencies conducting a negotiated procurement from making an award on the basis of initial proposals without discussions to other than the 'lowest overall cost' offeror where there would be at least one lower-priced proposal within the competitive range is affirmed.

The statutory language clearly precludes the making of discretionary cost/technical tradeoffs before discussions are held by requiring the selection of the most favorable initial proposal which is lowest in terms of cost and cost-related factors specified in the solicitation." (emphasis added.)

- "We objected to the award because it was made on the basis of initial proposals without discussions, Pan Am was not the lowest-priced offeror, and although Pan Am's technical proposal was judged to be superior to ACE's, there was no showing that ACE's proposal was so technically deficient relative to Pan Am's proposal and the other higher-ranked proposal that it had no reasonable chance of being selected for award if competitive range discussions were held." (emphasis added.)

- "We held that the CICA language, by its express use of the term 'lowest overall cost,' prohibits an agency from accepting for award an initial proposal that is not the lowest, considering only cost and cost-related factors specified in the solicitation, where at least one lower-priced initial proposal would be in the competitive range." (emphasis added.)

It is clear from these excerpts that GAO has used the terms "lowest overall cost" and "lowest price" interchangeably and has not made any distinction between the two. Accordingly, DOD clearly and specifically is precluded from making an award on the basis of initial proposals without discussions when the selected contractor is not the lowest-priced offeror.

Q. What factors would make it appropriate to conduct discussions in negotiated procurements?

A. There are two primary considerations as to whether it is appropriate to conduct discussions in negotiated procurements. The first factor involves material changes to the solicitation package after the package has been issued. Such changes might include significant additions or deletions to the statement of work, significant increases or decreases in the amount of services (i.e., level of effort) to be ordered or major changes to the amount or frequency of payments. Such changes normally would result in a requirement for offerors to revise their technical and/or cost proposals. In these cases, discussions should be conducted with each offeror who remains in the competition so as to ensure that there is complete understanding of the government's changed requirements and the expected response.

The second factor involves procurements for highly-complex supplies or services, particularly where contractors have the opportunity to offer new or unique approaches to satisfy the government's requirements. Such requirements often involve sophisticated policy development and modeling of alternatives, large-scale systems integration requiring hardware and software capability, and prototype development for system demonstration. These requirements usually will involve new systems or state-of-the-art technologies. In these instances, it may be appropriate for the government to conduct discussions with those offerors in the competitive range in order to ensure that the government fully understands each offeror's technical and management approach for accomplishing these complex tasks.

Q. Are there generic negotiated procurements for which discussions might be inappropriate? If so, please describe.

A. There are certain negotiated procurements for which discussions may be inappropriate and/or unnecessary. In the professional and technical services arena, these procurements generally involve services of a routine or simple nature, where highly-skilled personnel are not required and where the product or service to be delivered is defined clearly at the outset of the procurement. These work efforts generally require less complicated technical support services.

The best example of this class of procurement is base and test range operation and support contracts. Services for this type of procurement are normally covered by the Service Contract Act, where the skill level, hourly wage rate, and fringe benefit package are defined specifically in the solicitation. Since the specific services to be acquired are so well-defined at the outset, offerors can determine precisely what the government is buying, and the government can determine readily from the offeror's proposal whether an offeror can meet the government's specific requirement. For this class of procurements, discussions not only are unnecessary but also inappropriate in that discussions only would serve to lengthen an already protracted procurement cycle.

Notwithstanding, contracting officers should be the ones to determine when discussions need to be held with the offerors. Our experience has been that procurements for even similar type services vary so widely that it would be inadvisable to establish generic rules governing when discussions should be held. Instead, we would recommend case-by-case determinations by the contracting officer.

Questions Submitted by Senator Wallop, Answers Supplied by Mr. Fuqua

REGULATORY RELIEF

QUESTION: On page one of your statement, you mention that the industry has been working closely with the Department of Defense to streamline the regulations governing acquisition. Late last year, representatives of industry had claimed that the main focus of the DoD regulatory effort was simply to reduce the number of lines in the regulations. This so-called body count approach might have the effect of merely reducing the size of the regulations but not that paperwork and reporting burden they currently generate. What is your current perception of the DoD regulatory streamlining effort?

ANSWER: We remain concerned that the DoD's DMR regulatory relief effort is focusing primarily on reducing the volume of procurement regulations rather than on making fundamental improvements to the way DoD does business. The initial DMR procurement and contracting working group effort proposed eliminating DFARS appendices (in some cases redesignating them as handbooks), shifting material to other regulations, and eliminating outdated material, while rejecting all of AIA's and CODSIA's recommendations for substantive change. Now that the DMR project has been handed over to the OSD staff and the DAR Council, we are optimistic that a number of our recommendations are being seriously considered. AIA and other members of CODSIA have begun a constructive dialogue with OSD and the DAR Council and we have agreed to a two-step approach. The DAR Council will publish a streamlined DFARS for public comment later this summer. This revised DFARS is to be shorter, easier to read, and will eliminate some burdensome regulatory requirements. Industry is to provide input via a 60-day comment period. Following publication of the revised DFARS, OSD and the DAR Council have promised to turn their attention to more broad-based industry recommendations for improving the way DoD does business.

In short, the jury is still out on the DMR regulatory changes, but we have begun a constructive dialogue.

PILOT PROGRAM FOR MAJOR SYSTEMS

QUESTION: On page 2 of your statement, you advocate that the section 217 pilot program for major systems should be written to permit the testing of special contracting approaches for R&D where no production is anticipated. What changes to the DoD proposal need to be made to allow for this?

ANSWER: In our view, no specific changes to the DoD proposal in section 217 are needed to permit the testing of special contracting approaches for R&D where no production is anticipated. There may be valid reasons to test special approaches in the demonstration validation and full scale development phases, and we see no reason to limit these approaches to only contracts where production is anticipated.

COMMERCIAL PRICING CERTIFICATION

QUESTION: On page 3 of your statement you recommend that, in addition to repealing the commercial pricing certification requirement in 10 U.S.C. 2323, we should place a restriction in statute on the ability of the Department of Defense to require commercial pricing certificates from contractors except in limited cases. This seems to be an unprecedented restriction on the regulatory power of a Federal agency. Why do you feel it is necessary?

ANSWER: The Department of Defense is advocating the recision of the legislative basis for obtaining commercial pricing certificates;

however, there have been suggestions from other quarters that indicate they will enforce the requirement for these certifications through administrative actions.

RELEASE OF ACQUISITION INFORMATION

QUESTION: You expressed reservations about the DoD proposed regulations with regard to the release of acquisition information. What are some of your specific concerns? Do You have a line-in, line-out proposed revision of the regulation that you can share with the Subcommittee?

ANSWER: Although the proposed DoD directive on Release of Acquisition-Related Information has not yet been formally published in the Federal Register, the drafts we have seen lead us to conclude that despite the policy statement contained therein, DoD has not achieved in this directive a single, uniform policy on the release of acquisition-related information. Other key issues concern the limitations on release of planning, programming and budgetary information. This severely limits the reciprocal planning that must be done by industry to support the efforts of the government and to develop its own long term investment strategies. Further, industry remains extremely concerned that the definition of Source Selection Information is overly inclusive and will result in the proliferation of large categories of inappropriately restricted data.

[Additional information supplied by Mr. Fuqua:]

## COUNCIL OF DEFENSE AND SPACE INDUSTRY ASSOCIATIONS (CODSIA)

The Honorable John Betti
Under Secretary of Defense
(Acquisition)
The Pentagon, Room 3E933
Washington, D.C. 20301

March 15, 1990
CODSIA Case 26-88

Dear Mr. Betti:

The undersigned industry associations strongly urge that you not release the proposed DoD directive on Release of Acquisition-Related Information until you have considered several key issues elaborated below. While we appreciate that you are under some pressure to meet a March 29 deadline, we sincerely believe that publication of the directive in its current form would impede essential government/industry communications and complicate the process of meeting complex DoD requirements. In short, we believe substance should take precedence over timing--especially in any rulemaking situation involving essential communications in the procurement process.

It is our understanding that the directive is to be published within the next week and that it will be effective immediately, although public comment will be invited. While we sincerely appreciate the opportunity for public comment and the efforts that have been made to coordinate the draft unofficially with industry, it has been our experience that there is little real flexibility to revise a policy document after its initial effective date. We

strongly urge that you consider either delaying the effective date of the directive until after a public comment period or incorporate the changes summarized below prior to publication.

Earlier drafts of the directive included a statement that other DoD directives on the same subject were superseded by this directive. This statement was deleted from the latest draft, and industry considers that its reinstatement in even stronger language is essential. The requirement for this policy was initiated by the sense of the Congress that DoD policies at OSD, the agencies, and subordinate levels had proliferated and were conflicting and redundant.

No one knows how many policies there are within DoD on the release of acquisition information, much less how many statements on this subject can be found hidden away in directives and regulations on other subjects. If the proposed DoD directive is not to become just one more in the total, it must include a specific statement that (a) all other directives and policy statements on this subject are superseded and (b) agencies and subordinate activities are required to perform a document search to discover and delete or revise all such references.

Paragraph C.2.d.(1) provides a definition of "source selection information" that shall be restricted. Industry's concerns on this issue center around the potential for use of this definition to proliferate the number and kinds of documents that are protected as source selection information. In the five months that the procurement integrity statute was in effect, our experience was that the type of statement now found at paragraph C.2.d.(1)(j) ("Any other information which (i) if disclosed, would give an offeror a competitive advantage or jeopardize the integrity or successful completion of the procurement...") resulted in numerous additions to the list of protected documents, often simply because it was easier and safer for the buying office to do so. If the proposed directive is to accomplish its purpose of providing a single, uniform policy, then this authority must be curtailed.

We are also concerned that much of the information included in some of the protected documents (e.g., the technical evaluation plan) is available from other, nonrestricted sources, but its possession, if duplicated in a source selection information document, becomes a violation. These documents (the source selection plan and the technical evaluation plan) should be deleted from the list.

A third issue concerns the limitations in paragraph C.2.e on release of planning, programming, and budgetary information. As you know, the Services are actively engaged in important acquisition process improvements using Total Quality Management (TQM) methods. These efforts underscore the need for greatly improved government-industry teamwork to control new program affordability and scheduling. Perhaps the key element of such affordability teamwork will be positive interaction on scope vs. funding tradeoffs early in a new program's acquisition cycle. Clearly, inclusion of a new program's funding profile in draft RFP documents is the foundation for all such planning. The funding data would, of course, only be that which has been approved and would be made equally available to all potential offerors. This type of fundamental TQM-based process improvement is very consistent with the current Defense Science Board Task Group's emphasis on affordability and schedule breakthroughs. Yet, the proposed directive would prohibit all of this (See paragraph C.2.e(1)).

We hope that these concerns can be accommodated prior to the release of the directive. We in industry consider that the changes discussed above will contribute to a better understanding on our part of the government's needs and is also a fair and common-sense approach to a difficult and sensitive issue.

Sincerely,

John J. Stocker
President
Shipbuilders Council of America

Jean A. Caffiaux
Senior Vice President
Electronic Industries Association

Don Fuqua
President
Aerospace Industries Association

Mark Schultz
President
Professional Services Council

Wallace H. Robinson, Jr.
President
National Security Industrial Association

Questions Submitted by Senator Wallop, Answers Supplied by Mr. Williams

SENATOR WALLOP: When a contractor wins a contract on the basis of bidding labor rates using uncompensated overtime, does not the government benefit from paying less to get professional and technical services? Does not the government then only pay for the portion of an employee's time actually devoted to working on the government contract?

EARLE C. WILLIAMS: For one man-year of professional services effort, the government pays the salary for one year. The professional's annual cost to the government is not reduced by uncompensated overtime. There is a belief in some quarters of the government that mandatory uncompensated overtime benefits the government in that it purports to save the government money by producing lower hourly wage rates and, thus, lower direct labor costs. But the annual cost is not reduced.

In addition, you cannot ignore the increased costs of fatigue, accelerated worker benefit, decreased quality, increased turnover and resultant training, along with increased safety and reliability problems. The quality/productivity received in the tenth hour of a ten hour day is NOT equal to that of the eighth hour of an eight-hour day. While mandatory uncompensated overtime gives the appearance of dollar savings through lower per hour bid costs, any perceived savings often are more than offset by the added costs/reduced savings from decreased efficiency, quality, and productivity. This deterioration progresses rapidly as the extended workweek lengthens, thus, feeding on its own momentum in a highly competitive environment. Any illusion of cost savings must be seriously discounted and certainly should not be the basis for public policy regarding mandatory uncompensated overtime.

The practice of mandatory uncompensated overtime threatens to erode the long term commitment and motivation of salaried, professional personnel working in the defense sector. The practice of uncompensated overtime has no brakes on it. It proceeds down a "slippery slope" that begins with bidding 1 or 2 hours in excess of the standard 40-hour workweek and in its extreme form moves to 50, 60, or 70 hours per week for professional employees on multi-year contracts. This practice has continuing negative consequences for our industry. These adverse consequences are not idle speculation; they are happening NOW in firms that have been forced to use the practice of mandatory uncompensated overtime for survival purposes and are being "torn apart" by a mandatory 50-hour workweek for professional employees. Some of the problems created by mandatory uncompensated overtime include:

- o A double standard between professionals in the public and private sector that has no sound policy basis.

- o Serious erosion of motivation, pride, commitment, and a sense of professionalism among the skill-base upon which government agencies, particularly the Defense Department, depend for their most sophisticated and sensitive work.
- o A consequent reduction in the quality of work from professional employees attributable not just to lower morale but also to fatigue.
- o Increasing difficulty in attracting young, new talent into the professional work force as the practice becomes more widespread and its effects become more obvious.
- o An inability to meet surge requirements (typical of services-type contracts) because of the difficulty of motivating employees, already working an extended workweek, to commit extra effort during peak periods.

SENATOR WALLOP: It is our understanding that the greatest abusers of the practice of encouraging bids using uncompensated overtime has been the Navy on some of their Time and Material contracts. These contracts were let largely as a way to circumvent the time required to comply with the Competition in Contracting Act and involved buying generic "engineering hours." In the award of such contract, price tends to be the discriminating factor. How widespread is the practice otherwise? Could we not solve the Navy problem by expanding the master agreement authority we enacted in last year's Defense Authorization Act and thereby remove the need for the Navy and others to develop gimmicks to circumvent the Competition in Contracting Act?

EARLE C. WILLIAMS: Although the widespread use of uncompensated overtime has been highly publicized on Navy contracts, the practice is not limited to the Navy or to the use of Time and Material contracts. Uncompensated overtime can exist and, in fact, does exist in all three Services on all types of professional and technical services contracts. It may appear to be more prevalent in Time and Materials type contracts, because this type of contract has been more popular in the past three or four years for the procurement of professional and technical services. Notwithstanding this increased use of Time and Materials type contracts, there is no rational basis to restrict the proposed legislation to just these contracts. Since mandatory uncompensated overtime does occur in all types of contracts for professional and technical services, any solution must be applicable to all contract types.

The use of or expanded use of the master Agreement authority to buy services on a "product" basis is not the solution to the problem of uncompensated overtime. The Master Agreement authority simply will not solve the mandatory uncompensated overtime problem. The government currently has the ability to contract on a completion ("product") basis rather than on an "hours" basis. However, in order to contract on a completion basis, the end products

must be definable at the time the contract is awarded. When buying professional and technical services (i.e., "brain power"), the answer to the question or the solution to the problem is not know in advance. Many times, the tasks to be performed are so complex that the full extent of the problem is not known when the contract is let. This is the most significant difference between acquiring hardware, where the specification is well-defined at the outset, and acquiring professional and technical services, where there is not a defined specification.

One other problem with utilizing the completion or "product" format is that, in practice, it will not eliminate mandatory uncompensated overtime. Many contract officers are forced today to issue large, multi-year task order contracts that include very generic statements of work, with specific tasks to be assigned at a later point in time. In the source-selection process for these types of contracts, the contracting officer must rely heavily upon the analysis of labor rates that will be included in the ultimate contract for the purpose of pricing and negotiating task orders with specific statements of work. Even though the ultimate task order may be completion-or product-related, the basis upon which the offeror is selected is influenced heavily by his or her rate per hour for a category or labor. In our view, the issuance of product-oriented or completion-type contracts, therefore, will not eliminate the practice of mandatory uncompensated overtime. Moreover, we believe that the government presently is optimizing its use of completion-type contracts.

Therefore, absent DOD action, a legislative mandate to evaluate professional and technical services proposals on a 40-hour basis is the only reasonable solution to the mandatory uncompensated overtime problem.

[Additional comments and statements for the record follow:]

THE OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301-8000

PRODUCTION AND
LOGISTICS
(P)CPF

JUN 2 2 1990

Honorable Jeff Bingaman
Chairman, Subcommittee on Defense
Industry and Technology
Committee on Armed Services
United States Senate
Washington, DC 20510

Dear Senator Bingaman:

On June 13, 1990, the Subcommittee on Defense Industry and Technology conducted a hearing on the subject of uncompensated overtime and S. 2239, a bill which would require the Department of Defense to evaluate proposals for professional services on the basis of a 40-hour work week. In your opening statement, you indicated that the record for this hearing would be kept open until June 22 so that other organizations could submit their views on this subject. S. 2239 is of particular concern to the Department. Therefore, I request that this letter and its enclosures be included in the hearing record.

The Department opposes enactment of S. 2239 and has submitted its official position on this legislation to the Chairman of the Senate Armed Services Committee (Enclosure 1). A position paper on the uncompensated overtime issue is at Enclosure 2. Additionally, we have provided supplementary material which explains the issues in more detail and provides examples (Enclosure 3).

Thank you for the opportunity to provide our views on the uncompensated overtime issue and proposed legislation.

Sincerely,

Eleanor Spector

Eleanor R. Spector
Deputy Assistant Secretary
of Defense for Procurement

Enclosures

cc: Honorable Malcolm Wallop
Ranking Republican

Enclosure 1

GENERAL COUNSEL OF THE DEPARTMENT OF DEFENSE

WASHINGTON, D.C. 20301-1600

21 JUN 1990

Honorable Sam Nunn
Chairman, Committee on Armed Services
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

This is in response to your request for the views of the Department of Defense on S. 2239, 101st Congress, a bill "To amend title 10, United States Code, to require sealed bids and competitive proposals for the procurement of professional services by the Department of Defense to be evaluated on the basis of a 40-hour work week."

S. 2239 would require the head of an agency to evaluate sealed bids and competitive proposals for a contract for the performance of professional services as if the hourly labor rates for the professional employees carrying out the services (who are not covered by the Fair Labor Standards Act) are based on a 40-hour work week (regardless of the actual number of hours per week that the employee will work).

The Department of Defense opposes enactment of the proposed legislation for the following reasons:

1. The Department believes that it is inappropriate to restrict contractors from pricing their proposals based upon their assessment of competitive market conditions.

2. The Department believes that the proposed legislation is too broad and would affect all professional and technical services contract proposals. Even though uncompensated overtime can exist on all types of professional and technical services contracts, it appears to be limited primarily to time and materials type contracts where fixed hourly labor rates are required.

3. In addition, the proposed legislation would significantly increase contractor and government administrative effort and costs (e.g., additional contract audit and pricing reviews) since two contract cost proposals might be required. The first proposal submitted would be based on the standard 40-hour work week as the proposed legislation requires. The second proposal submitted would be based on the offeror's usual practice.

4. The proposed legislation may also be in potential conflict with Cost Accounting Standard 401 - Consistency in Estimating, Accumulating and Reporting Costs, which requires that a contractor's practices used in estimating costs in pricing a proposal shall be consistent with his cost accounting practices used in accumulating and reporting costs.

The Department of Defense Advisory Committee on Uncompensated Overtime, which was chaired by the Deputy Assistant Secretary of Defense for Procurement, recently completed a review of the uncompensated overtime issue, as required by Section 804 of the Fiscal Year 1989 Defense Authorization Act. The advisory committee's comprehensive findings and recommendations are contained in the "Report on Uncompensated Overtime" which the Under Secretary of Defense for Acquisition approved and forwarded to the Committee on Armed Services on March 29, 1990.

This report indicated that some defense contractors are requiring their professional and technical employees, who are exempt from the Fair Labor Standards Act, to work overtime (hours in excess of the "normal" 40-hour work week) on professional and technical services contracts without additional compensation. By requiring employees to work "uncompensated overtime", contractors are able to propose lower hourly rates for their services and thereby become more competitive in the highly competitive market place.

The advisory committee believes that the underlying cause of uncompensated overtime may be an over-emphasis on price (i.e., hourly rates) as an evaluation factor in the source selection process for professional and technical services contracts. Due to this emphasis on price, some contractors feel compelled to bid what may be unrealistically low hourly rates, based on using uncompensated overtime, in order to win contracts.

The members of the advisory committee believe that while the lowest price to the government should properly be the deciding factor in many competitive source selections for routine types of work, it should not be the deciding factor in more complex professional and technical services contracts. Accordingly, the proposed solution to the problem is the issuance of a Department of Defense policy memorandum to the Military Departments and Defense Agencies containing guidance for contracting officers emphasizing the need to place appropriate emphasis on quality in the source selection process for professional and technical services contracts. The proposed policy memorandum should eliminate the underlying cause of the problem, namely, the undue emphasis on price in the source selection process.

The use of uncompensated overtime is voluntary on the part of contractors. It is entirely a management decision made by the contractors based on their assessment of competitive market conditions. The Department of Defense does not require or encourage contractors not to pay their exempt professional employees for overtime hours worked. It is not, however, in the government's best interest to prohibit, restrict, or discourage any form of price competition, including the technique of uncompensated overtime, in professional and technical services contracts. Such a policy would interfere with free enterprise and the Competition in Contracting Act of 1984, and could preclude small businesses from entering into the government services contract market. Even if the Department were to prohibit contractors from proposing uncompensated overtime on professional and technical services contracts, it would not solve the problem. The problem would simply resurface in another form, such as reduced salaries or two-tier compensation systems. Accordingly, the proposed legislation is unwarranted.

The Office of Management and Budget advises that it has reviewed this report and, from the standpoint of the Administration's program, it has no objection to the views herein expressed.

Sincerely,

Terrence O'Donnell

cc: Honorable John W. Warner

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Enclosure 2

# DEPARTMENT OF DEFENSE POSITION PAPER ON UNCOMPENSATED OVERTIME IN THE PROFESSIONAL AND TECHNICAL SERVICES INDUSTRY

## DEFINITION

Uncompensated overtime means hours worked in excess of 40 per week, without additional compensation, by professional employees who are exempt from the Fair Labor Standards Act.

## PROBLEM

A number of professional and technical services companies are bidding uncompensated overtime in order to gain a competitive advantage as competition for Defense services contracts increases. The Department of Defense (DoD) sometimes uses time and materials contracts for repetitive ordering of professional services, where offerors propose an hourly rate for various categories of professional employees. The hourly rate includes the employee's salary, overhead, and profit. The hourly rate is set forth in the contract, and individual orders are then issued based on the number of hours necessary to perform a particular task, priced at the hourly rate.

Since time and materials contracts for professional services are labor intensive, competition among offerors centers around reducing labor rates to the maximum extent possible. By requiring employees to work uncompensated overtime, contractors are able to propose lower hourly rates for their services and thereby become more competitive. For example, if offerors A and B both pay salaried senior environmental engineers $83,200 per year, they could both propose a rate of $40 per hour based on a standard work year of 2080 hours (salary of $83,200/2080 hours per year = $40 per hour), plus overhead and profit. However, offeror B might instead propose a rate of $37 per hour if the senior environmental engineers at his firm actually work 43 hours per week (43 hours/week x 52 weeks/year = 2236 hours/year; salary of $83,200/2236 hours per year = $37 per hour). Thus, offeror B would propose a more attractive hourly rate because of uncompensated overtime. Because we buy hours on these contracts, the government gets a lower price.

## DOD POSITION ON UNCOMPENSATED OVERTIME

Not Required by Government. The Department of Defense does not require or encourage contractors not to pay their exempt professional employees for overtime hours worked.

Contractor Decision. The use of uncompensated overtime is voluntary on the part of contractors. It is entirely a management decision made by the contractor based on its assessment of competitive market conditions. The Department believes that it is inappropriate to restrict contractors from pricing their proposals based upon their assessment of competitive market conditions.

Restrain Competitive Pricing. It is not in the government's best interest to prohibit, restrict, or discourage any form of price competition, including the technique of bidding uncompensated overtime. Such a policy would interfere with free enterprise and the Competition in Contracting Act of 1984, and could preclude small businesses from entering into the government services contract market. Prohibiting the bidding of uncompensated overtime is anti-competitive.

Trigger Other Problems. Even if the Department were to prohibit contractors from proposing uncompensated overtime on professional and technical services contracts, it would not solve the problem. The problem would simply resurface in another form, such as reduced salaries or two-tier compensation systems.

## DOD POSITION ON PROPOSED LEGISLATION

Anti-Competitive. By seeking legislation that would require the Department to evaluate proposals for professional services on the basis of a 40-hour work week, the professional services industry is asking for protection from competition. Such legislation would effectively shield the professional services industry from price competition. No other segment within the Defense industry is protected from the competitive marketplace in this manner. The Department cannot support special treatment for the professional services industry. For the Department or Congress to prohibit the evaluation of bids which contain uncompensated overtime would be anti-competitive.

Increase Administrative Costs. The proposed legislation would significantly increase contractor and government administrative effort and costs since two contract cost proposals would be required. The first proposal submitted would be based on the standard 40-hour work week as the proposed legislation requires. The second proposal submitted would be based on the offeror's usual practice. Additional audits would have to be performed to ensure that uncompensated overtime is not included in the 40-hour work week proposals.

Restrict Management Flexibility. The imposition of additional micro-management statutory requirements on the source selection process will reduce the Department's flexibility to manage its resources effectively and efficiently and hinder the Department's procurement process.

Won't Help Employees. The proposed legislation will require the Department to evaluate proposals and make source selection decisions based on proposals which do not include uncompensated overtime. It will not preclude contractors from continuing to require exempt professional employees to work uncompensated overtime.

LEGISLATIVE BACKGROUND

In December 1987, the Senate Appropriations Committee requested the Department prepare a report regarding the practice of contractors bidding uncompensated overtime in offering professional and technical services for DoD contracts. The Department's report indicated that, based on a limited review, uncompensated overtime did not appear to be as significant as industry alleged. In addition, no quality or contract performance problems, nor exodus of professional employees from the Defense industry were being experienced as a result of uncompensated overtime.

In early 1988, proposed legislation (H.R. 4264, S. 2355, and S. 2254) dealing with uncompensated overtime was considered by Congress. This legislation would have required the Department to evaluate proposals for professional services on the basis of a 40-hour work week. Instead of passing legislation, Congress required the Secretary of Defense to: (1) establish criteria to ensure that proposals for professional and technical services are evaluated on a basis which does not encourage contractors to propose uncompensated overtime for professional and technical employees, and (2) establish an advisory committee to make recommendations on the criteria to be adopted by the Secretary and to submit a report to the House and Senate Armed Services Committees before implementing such criteria.

Proposed legislation (S. 2239 and H.R. 3651) currently under consideration is similar to the legislation considered in early 1988. It would require sealed bids and competitive proposals for the procurement of professional services by the Department to be evaluated on the basis of a 40-hour work week.

DEFENSE ADVISORY COMMITTEE ON UNCOMPENSATED OVERTIME

As required by the FY89 Defense Authorization Act, the Department of Defense Advisory Committee on Uncompensated Overtime performed a review of the uncompensated overtime issue. The joint Defense/Industry advisory committee's comprehensive findings and recommendations are contained in the "Report on Uncompensated Overtime" which the Under Secretary of Defense for Acquisition approved and forwarded to the Armed Services Committees on March 29, 1990.

The advisory committee agreed that the cause of the uncompensated overtime problem is an overemphasis on price (hourly rates) as an evaluation factor in the source selection process. Because of this emphasis on price, some contractors feel compelled to bid what may be unrealistically low hourly rates, based on using uncompensated overtime, in order to win contracts.

The members of the advisory committee believed that while the lowest price to the government should properly be the deciding factor in many competitive source selections for routine types of work, it should not be the deciding factor in more complex professional and technical services contracts. While industry members advocated the evaluation of proposals on a 40-hour work week basis, the government members could not agree to that approach because they considered it restraining prices in a competition. Committee members were able to agree to a compromise solution and recommended issuance of a Defense policy memorandum to the Military Departments and Defense Agencies.

The policy memorandum:

(1) emphasizes the need to place appropriate emphasis on technical and quality factors in the source selection process;

(2) recognizes that the contracting officer is in the best position to determine the weightings for technical and cost factors, and requires the immediate rescission of any policies to the contrary;

(3) requires identification of any hours in excess of 40 hours per week included in a proposal, and notification to offerors that proposals which include unrealistically low labor rates or which do not otherwise demonstrate cost realism will be considered in a risk assessment and evaluated appropriately; and

(4) requires contracting officers to ensure that the use of uncompensated overtime will not degrade the level of technical expertise required to perform the contract.

The policy memorandum should eliminate the undue emphasis on price in the source selection process, which the advisory committee members believe is the underlying cause of the problem. The advisory committee members also agreed that the proposed DoD policy memorandum would result in a meaningful improvement to the present contracting environment for professional and technical services.

The policy memorandum was issued by Donald Yockey, Principal Deputy Under Secretary of Defense for Acquisition, on May 4, 1990. Shortly thereafter, the Navy rescinded a memorandum it had issued on September 23, 1987, which conflicted with Mr. Yockey's memorandum.

ALTERNATIVES

o Postpone consideration of legislation until such time as we have had an opportunity to determine if the solution agreed to by the Defense Advisory Committee on Uncompensated Overtime and implemented by the Department corrects the problem.

o Permit the Department to implement the "Master Agreement" concept which was recently approved by Congress for testing, which should help lessen competition for hourly rates in the professional services industry.

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Enclosure 3

## DEPARTMENT OF DEFENSE (DoD) SUPPLEMENTARY INFORMATION ON UNCOMPENSATED OVERTIME

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## IMPACT OF LEGISLATION:

S. 2239 WOULD NOT PRECLUDE PROBLEMS THAT ARE ASSOCIATED WITH THE PRACTICE OF UNCOMPENSATED OVERTIME.

o The legislation will not require contractors to pay professional employees for hours worked in excess of 40 per week. It will only prevent DoD from evaluating proposals which include

uncompensated overtime.

o The legislation will motivate companies to find other ways to lower the prices they offer to the government, such as by reducing salaries or implementing two-tiered compensation systems.

S. 2239 WOULD INCREASE THE PAPERWORK AND ADMINISTRATIVE BURDEN ASSOCIATED WITH THE PROCUREMENT PROCESS.

o Every offeror using a full time accounting system would be required to submit two proposals: the first proposal would be based on a 40-hour work week and would be used by the government for evaluation and source selection purposes; the second proposal would be based on the company's actual full time accounting system, which includes any uncompensated overtime hours worked by employees.

o The government would evaluate each company's 40-hour work week proposal and select the winning offer on that basis. The government would then award the contract based on the "other" proposal which reflects the winning company's actual full time accounting system.

o This process could result in award to other than the low responsible offeror because DoD would not be able to evaluate the real prices offered; instead, DoD would be forced to evaluate fictitious prices and select the winning offer based on its evaluation of fictitious prices.

IF ENACTED, S. 2239 WOULD RESULT IN HIGHER PRICES FOR TECHNICAL SERVICES, THE SUBMISSION OF TWO PROPOSALS INSTEAD OF ONE BY MANY COMPANIES, ADDITIONAL AUDITS TO ENSURE THAT COMPANIES ARE SUBMITTING ONE PROPOSAL BASED ON A 40-HOUR WORK WEEK, AND ADDITIONAL PAPERWORK AND ADMINISTRATIVE BURDEN FOR COMPANIES AND THE DEPARTMENT.

## FULL TIME ACCOUNTING:

COMPANIES DECIDE HOW TO STRUCTURE THEIR ACCOUNTING SYSTEMS. However, the government establishes certain requirements that accounting systems must comply with if the company wants to receive government contracts.

DOD AUDITORS REVIEW COMPANY ACCOUNTING SYSTEMS TO MAKE SURE THE GOVERNMENT IS TREATED FAIRLY. In some cases, the auditors will find that a company is not keeping track of all hours worked by employees and, as a result, the government may be paying too much for the services it buys. An extreme example would be:

o A company engineer spends the entire year working on two studies contracts. Contract A is a cost reimbursement government contract, where the government will pay the actual cost of labor and overhead charged to the contract, plus a $6,000 fee. Contract B is a fixed price commercial contract, where the customer will pay $10,000 no matter what it actually costs the company to perform the study. The following data are recorded in the accounting records:

| | GOVT CONTRACT A | COMML CONTRACT B |
|---|---|---|
| Hours worked | 2,080 | 0 |
| Hourly labor rate | $22.50 | $22.50 |
| Labor cost | $46,800 | 0 |
| Overhead at 50% | 23,400 | 0 |
| Subtotal cost | $70,200 | 0 |

o Company management acknowledges that the engineer regularly works at least five extra hours each week without additional compensation; because of his dedication and hard work, he will receive a bonus of $4,000 which will be charged to the contract where his time was charged for the year--i.e., the government contract:

| | GOVT CONTRACT A | COMML CONTRACT B |
|---|---|---|
| Subtotal cost | $70,200 | 0 |
| Bonus | 4,000 | 0 |
| Total cost | $74,200 | 0 |

o The auditor finds that if the uncompensated overtime hours were properly recorded in the accounting records, costs would be the following:

| | GOVT CONTRACT A | COMML CONTRACT B |
|---|---|---|
| Hours worked | 2,080 | 260 |
| Hourly labor rate | $20.00 | $20.00 |
| Labor cost | $41,600 | $5,200 |
| Overhead at 50% | 20,800 | 2,600 |
| Subtotal cost | $62,400 | $7,800 |
| Bonus | 3,555 | 445 |
| Total cost | $65,955 | $8,245 |

IF THE AUDITORS DID NOT INSIST THAT ALL HOURS WORKED BY EMPLOYEES BE RECORDED, INEQUITIES WOULD CLEARLY ARISE AND THE GOVERNMENT WOULD PAY TOO HIGH A PRICE FOR THE SERVICES IT RECEIVES.

## UNCOMPENSATED OVERTIME STUDIES:

THE NAVY PERFORMED A STUDY IN DECEMBER 1987 OF 16 CONTRACT SOLICITATIONS WHICH INDUSTRY ALLEGED CONTAINED EXCESSIVE AMOUNTS OF UNCOMPENSATED OVERTIME. The Navy found:

o Approximately 26 percent of offerors' proposals included uncompensated overtime.

o Of those companies utilizing uncompensated overtime, the number of uncompensated hours proposed averaged 3.7 hours per week, with averages ranging from 1.7 to 6 hours per week.

IN MAY 1988, THE PROFESSIONAL SERVICES COUNCIL, THE CONTRACT SERVICES ASSOCIATION, AND THE SHIPBUILDERS COUNCIL OF AMERICA REQUESTED ARTHUR ANDERSEN & COMPANY CONDUCT A SURVEY ON THE PRACTICE OF UNCOMPENSATED OVERTIME. The industry survey, which was based on responses received from 82 companies, disclosed:

o Approximately 30 percent of respondents had submitted proposals to the government which included uncompensated overtime.

o Of those companies proposing uncompensated overtime, the number of uncompensated hours proposed averaged 5.4 hours per week, with averages ranging from 2 to 10 hours per week and the highest hours bid ranging from 2.5 to 14 hours per week.

THE RESULTS OF THE STUDIES WERE CONSISTENT: 26 TO 30 PERCENT OF COMPANIES IN THE PROFESSIONAL AND TECHNICAL SERVICES INDUSTRY ARE PROPOSING UNCOMPENSATED OVERTIME ON GOVERNMENT CONTRACTS, AND 3.7 TO 5.4 HOURS PER WEEK IS THE AVERAGE AMOUNT OF UNCOMPENSATED OVERTIME PROPOSED BY THOSE COMPANIES.

**LEGISLATION IS NOT NEEDED:**

DOD ISSUED THE POLICY MEMORANDUM RECOMMENDED BY THE DEFENSE ADVISORY COMMITTEE ON UNCOMPENSATED OVERTIME.

o Donald Yockey, Principal Deputy Under Secretary of Defense for Acquisition, issued the memorandum on May 4, 1990. Advisory committee members agreed that implementation of the memorandum should eliminate the underlying cause of the uncompensated overtime problem, which is too much emphasis on price in the source selection process.

o On May 31, the Navy rescinded its September 23, 1987, memorandum entitled "Source Selection Procedures Within the Navy," which was considered by industry to be a major contributor to the uncompensated overtime problem.

DOD ACQUISITION REGULATIONS WILL BE REVISED TO REFLECT THE POLICY STATED IN THE YOCKEY MEMORANDUM.

THE MASTER AGREEMENT LEGISLATION SHOULD HELP REDIRECT COMPETITION IN THE PROFESSIONAL SERVICES INDUSTRY.

o Under the Master Agreement concept, individual orders would be competed among several prequalified companies who have been awarded Master Agreements, thereby significantly reducing the amount of time required to award contracts and diminishing the government's need to award time and materials contracts.

o Congress recently approved this concept for testing, and DoD will soon publish a proposed rule on its implementation for public comment.

IN SUMMARY, THE ACTIONS ALREADY UNDERWAY WITHIN THE DEPARTMENT OF DEFENSE WILL CORRECT THE PROBLEM. ADDITIONAL LEGISLATION IS NOT NEEDED.

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INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
400 ARMY NAVY DRIVE
ARLINGTON, VIRGINIA 22202-2884

JUL 3 1990

Honorable Jeff Bingaman
Chairman
Subcommittee on Defense Industry
and Technology
Committee on Armed Services
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

Thank you for the opportunity to review and respond to the testimony presented on June 13, 1990 on behalf of the American Electronics Association (AEA) regarding Section 208 of the Defense Management Improvement Act (S. 2440). In that testimony and an accompanying point paper, the AEA took exception to our position that, based on the facts presented

to date, we cannot support relaxation of the safeguards provided by the current requirement to submit certified cost or pricing data for contracts exceeding $100,000.

We have repeatedly expressed our openness to new information on the matter. We would welcome factual information showing that the risk of defective pricing in contracts under $500,000 is minimal, or at least declining. We would like an explanation of why the current waiver authority does not suffice to exempt vendors selling commercial products to the Government from the data requirement. We would be keenly interested in knowing why compiling either an exemption request or the cost or pricing data themselves is costly and burdensome. Finally, we would like to understand the basis for the AEA testimony that raising the threshold would reduce the procurement lead times of all affected purchases by 60 to 90 days. In our view, no new information addressing those points has as yet been made part of the public record. We appreciate the attempts of the Subcommittee on Industry and Technology to complete the public record and to ensure that there is a constructive dialogue on Section 208.

Much of the AEA testimony and point paper were devoted to denigrating the relevance of the statistics we have cited concerning defective pricing reviews by this office and the Defense Contract Audit Agency (DCAA). I would like to assure the Subcommittee that we do not claim that half of all contracts in the $100,000 to $500,000 range are defectively priced. Our 1987 study was not intended to determine the exact frequency of defective pricing or its severity. Defective pricing in any amount or percent of contracts awarded should not be dismissed as inconsequential, even if, on average, "only" 5 or 10 percent of the contract value is inflated. Our study clearly demonstrated that defective pricing is a reality in all strata of contract value, including the $100,000 to $500,000 range. The results of the fiscal year 1989 DCAA efforts--defective pricing found in 84 of 157 pricing actions reviewed in the $100,000 to $500,000 range--corroborate the indication of risk. Hopefully, the fact that our 1987 sample and the DCAA coverage in fiscal year 1989 focused on higher risk situations means that defective pricing in the entire contract population in the $100,000 to $500,000 range is far less pervasive than in the sampled population.

In a recently issued audit report entitled "Spare Parts Pricing Agreements," dated May 31, 1990, we reported that spare parts pricing agreements were misused and often resulted in overpricing. Many of the individual orders placed under Basic Ordering Agreements exceeded the $100,000 threshold, but cost or pricing data were not requested although we believe they were required. Defective pricing was found on all of the 28 orders audited. Those results are a further indication that defective pricing is an ongoing problem and increase our concern over whether Section 208 is the right answer.

In summary, we continue to oppose Section 208, although we are actively pursuing further dialogue with its proponents and will carefully consider any new information that is presented. In the interest of a complete public record, we would appreciate your inclusion of this letter in either the June 13, 1990 hearing record or the Committee report on S. 2440.

Sincerely,

Susan J. Crawford
Inspector General

cc: Honorable Malcolm Wallop
Ranking Minority Member

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ARMED SERVICES COMMITTEE
1990 JUN 15 PM 1:45

**THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA**

June 14, 1990

Senator Sam Nunn
Chairman, Senate Armed
Services Committee
U.S. Senate
Washington, D.C. 20510

Dear Mr. Chairman:

The Associated General Contractors of America is a construction trade association representing more than 32,500 firms, including 8,000 of America's leading general contracting companies, which are responsible for the employment of more than 3,500,000 employees. These member construction contractors perform more than 80% of America's contract construction of commercial buildings, highways, bridges, heavy-industrial and municipal-utilities facilities.

AGC would like to take this opportunity to comment on Sections 204 and 218 of the Administration - sponsored Defense Management Improvement Act (S.2440), introduced on April 5, 1990. Sections 204 and 218 deal with the subjects of competitive negotiation and Davis Bacon Act requirements respectively.

Section 204 -- Competitive Negotiation

Section 204 of S.2440 authorizes DoD to evaluate and award a contract using "competitive negotiation", without discussion, to a contractor whose proposal represents the greatest benefit to the government based on evaluation factors set out in the solicitation.

This provision does not address the concerns of construction contractors with the "competitive negotiation" process. Over the last few years, AGC has noticed an

increasing trend in federal construction procurement toward "competitive negotiation" over sealed bids. Inherent in the "competitive negotiation" process is subjective decision-making, which does not assure awarding the contract to the construction contractor with the lowest responsible bid. AGC believes that the most cost effective and unbiased method of awarding federal construction contracts is the competitive sealed bidding process, where the lowest responsible bidder is awarded the contract.

AGC is greatly concerned about the effect "competitive negotiations" are having on small firms, which constitute the vast majority of construction contractors in this country. By its very nature, "competitive negotiation" raises a construction contractor's bid costs by three to four times over a sealed bid. In addition, the delay inherent in awarding a construction contract through "competitive negotiation" ties up a construction firm's bonding capacity so that it is unable to take on any further work until the completion of negotiations. The end result of this trend toward "competitive negotiation" and away from sealed bids will ultimately be the elimination of most small construction firms from participating in federal construction.

Because of these concerns, last year AGC issued a report entitled "Report on Construction Quality: Competitive Negotiation v. Sealed Bids in Federal Construction Procurement." AGC recommends that S.2440 to incorporate the report's recommendations, as follows:

1. The FAR Council should be directed to modify the FAR so that it states clearly that the Competition in Contracting Act (CICA) is oriented toward hardware and technology procurement and not construction.

2. The FAR Council should be directed to restate and clarify that the FAR:

- affirms a preference for sealed bidding in federal construction;
- clearly delineates the exceptional circumstances when negotiated construction procurements may be appropriate; and
- clearly sets forth the procedural safeguards procurement agencies are to follow before a negotiated construction procurement is allowed to proceed.

3. For those exceptional situations which may warrant a negotiated federal construction procurement, the FAR Council should be directed to include in the FAR a process for review of a contracting officer's recommendation for a negotiated construction procurement. This review process should require the written justification of the contracting officer, and the approval of the Head of the Agency involved for any negotiated construction procurement to proceed.

Section 218 -- Davis Bacon Act Requirements

AGC supports Section 218 of S.2440, which amends the Davis-Bacon Act by raising the threshold for application of that statute to contracts in excess of $250,000, and expands the use of helpers.

AGC's longstanding position is that the Davis-Bacon Act is unnecessary, economically unsound, exceedingly difficult to administer and should be repealed. Until Davis-Bacon is repealed, however, AGC supports continuing efforts to reform and restrict its application.

Regardless of the original purpose of the Davis-Bacon Act, economic conditions and the construction industry of 1990 bear no resemblance to 1931. The purchase of construction services by the federal government should not dictate additional costs which do not exist in the private sector.

When considering the necessity of applying the Davis-Bacon Act to projects funded by programs today, it is very illuminating to keep in mind the average wage rates for some of the crafts typically employed on these projects.

For instance, the national average collectively bargained wage and fringe rate for bricklayers as of January 1, 1990, was $24.26 per hour; for carpenters $22.90; for laborers $18.71.[1] The Department of Labor often accepts collectively bargained wage and fringe rates for crafts on Davis-Bacon construction. The fact is that construction wage scales are primarily established by market forces. In an era of shortages of workers, construction contractors who do not have collective bargaining agreements are paying equally high wage rates to secure their workers. This hardly seems like a situation in need of federal protection.

The family housing construction programs of the Defense Department are budgeted for over $3.45 billion in fiscal year 1991. This constitutes over one-third of the Department's entire construction budget. Imposing prevailing wage requirements on this construction can absorb several hundred million dollars of the total amount budgeted.

It has been argued that the higher wage rates frequently imposed by the Davis-Bacon Act result in the hiring of more productive and cost-effective workers -- thus neutralizing any inflationary wage effect and ensuring "quality" construction. If this is true, projects constructed with Davis-Bacon wage and labor practices should cost less than comparable private projects. The research conducted on this issue to date does not confirm this proposition.

In 1974, Florida exempted construction initiated by county school boards from the state prevailing wage law. Florida calculated prevailing wages under its law on the same basis as Davis-Bacon. In 1978, when a bill was introduced to subject this construction to the state prevailing wage law again, 22 Florida counties calculated the dollar savings resulting from the exemption. The cost savings averaged 15% for all 22 counties, and ranged from 2% to 25%. None of the reporting counties noted any differences in the quality of buildings constructed under the prevailing wage and those that were not. Florida found this data to be very persuasive when it repealed the state prevailing wage law in 1979.

Likewise, an Oregon State University study found that total construction costs for public building projects in rural areas subject to the Act were 25% to 37.7% higher than comparable private projects. Again, there were no differences in the quality of construction.

For the above reasons, AGC supports the repeal of the Davis-Bacon Act. AGC also supports the reforms contained in Section 218 of S.2440, which would raise the threshold for application of the Act to $250,000 and expand the use of helpers.

Sincerely

Kirk Fordice

Kirk Fordice
President

cc: Senator Jeff Bingaman
Senator Malcolm Wallop

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[1]. Construction Labor Research Council, Construction Labor Trends and Outlook (February 1990)

HEWLETT PACKARD

June 14, 1990

The Honorable Jeff Bingaman
United States Senate
221 Senate Hart Office Building
Constitution Avenue and 2nd Street, NE
Washington, D.C. 20510

Dear Chairman Bingaman:

I have had the opportunity to review the proposed Defense Management Improvement Act (DMIA) and wanted to share my thoughts as you begin your consideration of the proposal.

I recently suggested in House testimony that, in the main, it is premature to legislate broadly in this area when the Defense Management Review (DMR) process has yet to be fully implemented. Ideally, we should hope to find that much can be accomplished through good faith management initiative without resort to major legislation.

I am not suggesting that the DMIA package is without merit. It deserves attentive review over time. I am, however, disappointed that new legislation is being proposed while existing legislative initiatives from 1989 are yet to be fully implemented. I share the view that over-legislating is no solution to government problems. Nevertheless, there are exceptions where solutions to some problems do require statutory action on occasion. For example, Section 208, the proposal to raise the TINA threshold, makes obvious practical sense and should be approved immediately. In fact, I recommend that the threshold also be indexed for inflation so that the procurement system does not continue to ignore the economic realities of the marketplace. Conversely, the armies of auditors which would be required to begin to review even a meaningful percentage of the transactions below $500,000 could not possibly be justified to the taxpayer on the basis of realistic net benefit. And, most offensive of all, the current collection and certification of voluminous data which lacks practical utility is simply an unacceptable policy. Therefore, in my view, if you want to make a change which would really attract more commercial suppliers to the federal market, and keep them there, this simple cost and pricing data reform would be a significant step forward.

Section 208, however, stands in contrast to Section 202 on Commercial Products. Previous work in this area has correctly focused on removing gross impediments to the acquisition of commercial products. Section 824 of last year's Defense Authorization Act was an excellent initiative, although it is yet to be implemented. It needs to be fully implemented at the earliest possible date, and in a manner that is genuinely reform-minded. I also agree that similar policies are needed government-wide, along the lines of S. 1957. In this regard, I strongly urge that you also seriously consider a proposal put forth earlier this year by Congressman Frank Horton. I believe that these two initiatives are compatible, consistent, and necessary; taken together they would constitute truly landmark reform.

Today a new commercial product is often very difficult to buy in the federal government. Insistence on submission of cost and pricing data from commercial companies because a product is new or innovative is a government practice which serves no one well. Market research, price analysis, comparative market analysis, and other similar techniques, should allow the government to determine a fair range of price reasonableness as a basis for negotiations. American businesses have to be informed buyers rather than relying on vendor certifications of proprietary financial, sales or technical data; so should the government. In fact, this is a good example of a basic commercial practice which the government can and should adopt right now. And, obviously, when a procurement action is a full and open competition, cost and pricing data should

not even be an issue. It is, unfortunately, often an issue today. This practice must change because these continuing demands for such proprietary disclosures seriously undercut the benefit of having competition in the first place.

Buying quality is another critical objective, and while the law allows it today, day-to-day practice does not. What is needed are more functional specifications and a forthcoming approach to revealing what the government actually needs in a procurement. This requires open identification of what is really important in evaluation criteria. Once so identified, then the process must stick to its objectives and apply the weighted criteria in a disciplined fashion. Doing this in a serious and open fashion will not only allow the government to actually buy the quality they need, but will produce decisions which will be stable after contract award. This sort of cultural change could be implemented beginning today if the management commitment were made to do so.

Unfortunately, Section 202 does not address the real reforms which are needed to make commercial product acquisition better. Rather than actually advancing the important concepts of paperwork reduction, real market research, quality buying, market acceptability, or other critically needed changes to the culture of the procurement process, it seems to be directed to achieve some other policy agenda. The fact is that current law allows, even encourages, the government to buy smart today, but the system does not optimize the use of these policies. Therefore, what is really needed is a cultural change which implements the tools already at the government's disposal, but this requires the will to do it.

Competition is not the stumbling block to the government buying more commercial products. Moreover, the American taxpayer is not asking for a retreat from full, fair and open competition, especially given the heightened public visibility of the procurement process over the past decade. It is inherently contradictory to call for better reliance on market competition as the preferred protection for the government's contractual interests, and then to treat competition as if it were the impediment to reform. To the contrary, re-regulating the relative openness of the government market is no more attractive as a matter of public policy than are those foreign rules which narrow the access to international markets. An open competitive market with a level playing field is in everyone's interest. Likewise, having an objective forum where due process can resolve legitimate procurement disputes in a fair and balanced manner is also not an impediment to buying commercial products. To the contrary, since this customer is also the sovereign, the potential for unchecked exercise of arbitrary executive authority could severely lessen the attractiveness of the government as a customer for commercial companies. So, before sweeping changes of the sort proposed in Section 202 were to ever be voted, I would hope that the Congress would cautiously consider the objectives and likely effects for such changes, as well as the practicalities of what would be lost and what would be gained. For the foreseeable future, the Senate and House should instead move ahead with more practical systemic improvements, along the lines of S. 1957 and the Horton initiative, and Congress should then exercise ongoing oversight of implementation and results.

Sections 204 and 217 raise other questions. Legislation should not focus on overhauling a statute on the basis of a skewed reading of case law or arbitrarily sweeping aside all basic statutory checks and balances of the system. Instead we need to get on about the business of changing the procurement culture. Acquisition personnel need to be trained in what market research and analysis is and how to use it, in how the reasonable concept of market acceptability is within the scope of current law, and how requiring more paperwork and data disclosures for the sake of filling a file is the greatest administrative failing of all. In short, the culture needs to integrate a new standard of common sense understanding and application of public policies.

A major initiative at reeducating and training our personnel, including the regulators themselves, must be at the center of any serious effort at cultural change and managerial reform. It is a truism that simply throwing more money at our social problems, or legalizing all sorts of societal activity, is no solution to our nation's ills. Likewise, throwing more disruptive laws at the acquisition process will not improve the procurement system nor would simply repealing laws wholesale. That is why I strongly believe the DMR process should instead go

forward with vigor. Common sense application of current law should be the centerpiece of meaningful reform of both regulations and day-to-day practices. Where there is genuine need for legislative change, such needs, will be identified over time as a byproduct of a successful DMR process. Today that process is still in its very earliest stages.

I hope these thoughts are helpful. The system has a much greater capacity for self-improvement and self-correction than has yet been exploited, and Congressional oversight is one of the best tools around for seeing to it that it begins to happen.

Sincerely,

David Packard
Chairman of the Board

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**NATIONAL SECURITY INDUSTRIAL ASSOCIATION**
**National Headquarters**

W. G. Corgan
*Chairman,*
*Board of Trustees*
M. C. Baird, Jr.
*Vice Chairman,*
*Board of Trustees*
*Chairman*
*Executive Committee*
J. F. Caligiuri
*Vice Chairman*
*Executive Committee*
W. H. Robinson, Jr.
*President*

COMMENTS ON TITLE II S-2440 "DEFENSE MANAGEMENT IMPROVEMENT ACT"

Section 201. Multiyear Contracting Enhancement

Current law requires that Department of Defense (DoD) programs under consideration for submission to Congress for multiyear contracting authority meet certain criteria. Among these criteria is a requirement that the program achieve a 10 percent savings through the multiyear approach when compared with current negotiated contracts or future annual contracts.

The following statutory criteria which must be met before DoD may propose a multiyear funding request to Congress currently exist:

o That the current five year defense program fully funds the support costs associated with the multiyear request;

o That production rates are at least equal to minimum economic rates;

o That a minimum 10 percent savings through the use of multiyear contracting would be achieved; and

o Full funding of the termination liability.

Section 201 repeals these criteria.

In addition, the present requirement that the use of multiyear contracts will result in "reduced total costs under the (multiyear) contract" would be modified to require "substantial savings of the total anticipated costs of carrying out the multiyear program."

Industry supports this DoD proposal. Multiyear procurements on major systems and subsystems have proven successful. According to DoD, from 1982 through 1988 Congress has approved 58 multiyear requests, with estimated savings of $9 billion compared to annual procurement. To the extent that other factors support the multiyear request, an arbitrary threshold for cost savings should not be a barrier to Congressional review of otherwise valid candidates.

It should be noted that even with the elimination of these thresholds, Congress must still actively approve each request for multiyear contracting as section 201 does not address the requirement for express Congressional approval for initiation of the procurement action leading to award of a multiyear contract.

Section 202. Commercial Practices

For many years industry has given extensive and consistent input to the Office of Federal Procurement Policy, the Office of Information and Regulatory Affairs, the Department of Defense, the General Services Administration, and the Congress regarding impediments to the acquisition of commercial products. Those impediments primarily concern excessive and unnecessary cost or pricing data and price and sales data disclosures, technical data rights requirements, flowdown of government terms and conditions to commercial subcontractors and suppliers, interference with established material and components arrangements, interference with established manufacturing operations, uncertainty caused by continually changing regulations, and ever growing numbers of certifications, which result in serious paperwork burdens and proprietary intrusions. If a product is sold legitimately in the commercial marketplace, additional government contractual provisions are inappropriate. Section 202 deals with various policy concerns long expressed by executive agencies, but it does not address the impediments identified by industry. In this regard, the proposal is not responsive to the actual problems of commercial product acquisition.

The acquisition of commercial products by DoD can best be improved by full regulatory implementation of Section 824 of the FY '90 Defense Authorization Act, and enactment of a companion statute to deal with civilian agencies, as proposed by Senators Levin, Glenn, Cohen, and Roth in S. 1957, the "Nondevelopmental Items Acquisition Act of 1989". Such a statute could also be modified to take further steps toward correcting the serious paperwork and disclosure burdens being imposed on the sale of commercial products. Such a recommendation was recently proposed by Congressman Frank Horton and has been endorsed by the U. S. Chamber of Commerce, American Electronics Association, Electronic Industries Association and other concerned groups and associations. Congressman Horton's proposal addresses numerous problems in commercial products procurement identified by industry, such as requirements for submission of cost or pricing data where competition or the availability of relevant sales data makes such disclosures inappropriate. This proposal would require development of a standard form commercial contract, an increased use of functional requirements rather than design specifications, and an emphasis on the government's use of market research over burdensome and intrusive data disclosures by commercial products suppliers.

Such a unified approach, providing the best elements of S. 1957 and the Horton amendment, would better address the actual, identified impediments to commercial product acquisition. We strongly recommend it as the preferred approach to this important set of issues.

Section 203. Rescission of Commercial Pricing Certification Requirement

Industry fully supports the rescission of both the legislative and regulatory requirements for the obtaining of commercial pricing certificates. These requirements are extremely costly and paperwork

intensive. In addition, the government is sufficiently protected under other laws including the False Claims Act, Program Fraud and Civil Remedies Act, and the Major Fraud Act. Further, Congress should specifically deny authority for the executive branch to write regulations requiring the submission of commercial pricing certificates to the government.

Section 204. Award Without Discussions

DoD has proposed certain changes to the Competition in Contracting Act (CICA) to broaden the Department's flexibility to award negotiated contracts without discussion. The DoD's rationale for this change is predicated on their belief that certain General Accounting Office (GAO) cases have interpreted the law to require award to the lowest price offeror when award is made without discussion.

In our view, DoD's interpretation of the GAO decisions is unnecessarily restrictive. We believe GAO's interpretation of CICA would permit consideration of all cost-related factors listed in a solicitation in determining lowest overall cost and will also permit consideration of other mandatory non-cost requirements. In our opinion, the GAO decisions do not require award to the lowest price offeror.

Fundamentally, however, DoD's proposal makes no provision for identifying the relative importance of source selection criteria. Evaluation criteria and their relative weights or range of weights should be identified in procurements whether award is to be made with or without discussions. The absence of this information permits award decisions to be entirely subjective, which we believe has a negative impact on the stability and effectiveness of the acquisition system. For the foregoing reasons Section 204 as proposed is not an appropriate or complete solution to the evaluation criteria/award issues.

Section 205. Procurement Simplification -- Uniform Threshold for Various Socio-economic Requirements

This section amends or deletes 21 provisions of current law to provide for a uniform, government-wide threshold for the application of the small purchase procedures. We strongly support this provision of the bill. Small purchases account for virtually all of the Federal government's contract actions but only a very small percentage of appropriated dollars. In fiscal year 1989, small purchases constituted approximately 98.1% of the actions, but a mere 1.9% of the dollars.

Many of the specific dollar thresholds for application of individual procurement provisions were established at the specific dollar amount in effect for a small purchase at the time the provision was created. By deleting the specific dollar amounts in each and replacing them with a reference to a uniform "small purchase threshold," we can achieve the dual purposes of (1) correcting the application of these provisions to only large purchases, where the cost of implementation and oversight can be justified and (2) simplifying future statutory administration of the dollar level of the threshold.

Section 207. Competitive Alternative Source Requirement

Current law (10 U.S.C. 2438) contains a preference for dual sourcing and requires detailed justifications where dual sourcing is not considered appropriate. Section 207 would amend the statute to state that dual sourcing is mandatory when it would likely result in reduced costs, would not result in unacceptable delays, and would otherwise serve national security interests. We support the amendment. The change would retain a preference for dual sourcing when it is cost effective, but would provide

the Secretary of Defense with needed flexibility in reaching an appropriate decision on the method of procurement.

Section 208. Certified Cost or Pricing Data Threshold

Section 208 would amend the Truth in Negotiations Act, raising the threshold for the mandatory submission of certified cost or pricing data from $100,000 to $500,000. Raising the threshold would account for inflation (the low threshold was set in 1962; $100,000 would total more than $467,000 in today's dollars).

We strongly support raising the threshold to a minimum of $500,000. This increased threshold would likely enhance the participation of commercial companies and small and medium-sized contractors in the Department of Defense marketplace. It would also likely facilitate the adoption of commmercial buying practices by the DoD. Raising the threshold would be consistent with the Cost Accounting Standards threshold, raised to $500,000 in 1988.

The low threshold imposes an enormous paperwork burden on contractors. Had the $500,000 threshold been in effect in 1988, the number of contract actions covered would have been reduced from 43,768 to 15,375. Yet there only would have been a 7.5% reduction in dollars covered.

In addition, a recent report to Congress from the Office of Federal Procurement Policy entitled, "Federal Procurement Paperwork Burden" noted that, "The expense of compiling cost or pricing data at the level of detail and in accordance with government cost accounting standards can be substantial. Certification of data requires contractors to exercise a high degree of care...and often requires them to employ specialized legal and accounting assistance, thereby further increasing costs."

Contrary to perceptions held by some officials that a higher threshold will shield a significant number of contracts from government audits and recovery of excess costs, raising the threshold does not preclude the government from asking for cost or pricing information when appropriate. Consequently, we believe this amendment would improve the operation of the Federal acquisition system without exposing the government to the threat of waste or fraud.

In summary, it is our belief that increasing the threshold to a minimum of $500,000 would bring many benefits to the Department of Defense, would help strengthen the industrial base and would provide savings to the taxpayer.

Section 217. Pilot Program for Major Defense Acquisition Programs

To retain a strong national defense in this period of declining budgets and a deteriorating defense industrial base requires innovative alternatives to the existing flawed defense acquisition process. Section 217 of the proposed legislation, in the broad sweep of its waiver authority, enables the Secretary of Defense to explore bold and creative approaches.

We believe the use of pilot programs has merit. However, we recommend that the legislation stipulate that the waiver of any provision of law or of regulation which affects any provision of the contract is authorized only with the mutual consent of the contractor and the government. The pilot programs should promote a cooperative relationship between government and industry by permitting industry participation in their design. Furthermore, such pilot programs should feature special contracting approaches for research and development programs where it is not anticipated that production will occur.

We also note that the acquisition of commercial products should be dealt with exclusively in the congressional treatment of Section 202, our recommendation for which we have offered elsewhere in this document. Thus, Section 217 should clearly not be extended to cover commercial product procurement as that would cause considerable confusion and uncertainty, adversely affecting the advancement of policies for commercial product preference and associated acquisition reform.

If properly implemented, section 217 could permit greater flexibility in acquisition decisionmaking; encourage innovative problem solving; accelerate the pace of the acquisition process; and restore a degree of trust between the industrial supplier and the government customer. We believe pilot program alternatives can and should be developed that will satisfy Congressional oversight prerogatives, grant the flexibility that DoD seeks, and create a more functional acquisition system without jeopardizing the taxpayer's interest. We would be pleased to work with the DoD and interested Members of Congress to ensure that section 217 programs meet these ends.

Section 218. Davis-Bacon Reform

Industry has long supported reform of the Davis-Bacon Act. Accordingly, we support Section 218 of this bill which is designed to raise the contract threshold to $250,000; allow for the expanded use of semi-skilled helpers; reduce needless paperwork requirements; and more accurately define the true definition of a prevailing wage. According to the Congressional Budget Office, this reform would save $2.5 billion in outlays over five years. This reform proposal would only exempt seven percent of the total dollar volume of Davis-Bacon contracts.

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STATEMENT OF THE

SEMICONDUCTOR INDUSTRY ASSOCIATION

GOVERNMENT PROCUREMENT COMMITTEE (SIA/GPC)

The Semiconductor Industry Association, Government Procurement Committee (SIA/GPC) is pleased to have this opportunity to voice our support for the acquisition reforms outlined in the Defense Management Improvement Act, and present the reasons for our endorsement of this bill.

The Semiconductor Industry Association was formed in 1977 to represent the common interests of industry in matters of trade and public policy. Today it's member firms represent over 90% of the U.S. based semiconductor industry. In early 1985, with the increasing focus on the government procurement system, the growing debate on foreign dependency and military specification issues, the SIA Board of Directors voted to establish the

Government Procurement Committee (GPC). SIA/GPC's member companies collectively supply over 90% of the semiconductors ultimately purchased by the U.S. Government for use in military aircraft, missile, space and electronic communications applications.

The primary objective of the GPC is to support the existence of a viable, efficient U.S. based source of high quality semiconductors for government end use. Our committee has prioritized as it's number one issue, the streamlining and improvement of the military semiconductor procurement system. We are working to impact changes to the Federal Acquisition Regulations by eliminating obstacles which inhibit the insertion of the latest technologies into DoD applications. The "Commercial Style Acquisition Practices" cited in the "Commercial Products Acquisition Act of 1990," are consistent with many of the efficiencies we have been trying to promote.

In today's environment, the Government is not able to take full advantage of the rapid product cost improvements, manufacturing efficiencies, quality improvements and technology innovations driven by our highly competitive electronics market. Government acquisition policies, which have no use in our commercial market, are threatening the supply of new products to the Government and limiting suppliers willing to participate in Government business, particularly at the lower tier subcontractor level. This is a trend which we see escalating at an alarming rate. What is so unfortunate, is that this trend is escalating not because suppliers do not want to support government business, but because they are not able to deal with the burden of unique requirements imposed through current Government acquisition practices and law. One law which is a key contributor to the flow down of these burdensome requirements to small subcontractors is the low dollar threshold of $100,000,

stipulated by TINA, (Truth in Negotiations Act) for certified cost or pricing data. Increasing the TINA threshold to $500K would contribute to the relief of a major percentage of the burden of doing business with the Government under the current acquisition process, which is why it was so important to us to be able to express our views today.

There are five key issues which we request you consider as ample justification for passing the Defense Management Improvement Act.

- Current Government acquisition policies have created the following negative impact on semiconductor products procured for Defense Department use:

1. Increased costs of military electronic equipment.
2. Limited supplier base for DoD business.
3. Delays new technology insertion in government systems.
4. Imposes government accounting systems not utilized in volume commercial business.
5. Contracts between $100K and $500K threshold contributes nearly 70% of the paperwork burden of the semiconductor industry. Statistics show a similar affect of 68% of DoD actions, while only impacting 7.4% of DoD dollars.

Discussion of Impact #1:

Isolation of military and commercial manufacturing for the primary purpose of isolating costs for government collection purposes is increasing product prices on semiconductors for military equipment. One of our member companies cites a real life example of an aerospace company's procurement of a product which is manufactured routinely in an overseas facility. A cost accounting system which would conform to CAS requirements does not exist in this facility. This defense customer claimed he could not procure this device without cost data certified on an SF1411. He paid $8.00 a unit to have this device manufactured in

the U.S. in a facility which had the cost collection capability he required. The offshore part would have cost him $1.00. The specs and quality level were no different.

When product specifications and processes are the same for commercial and military applications, there is no benefit nor rationale for maintaining separate facilities except for the need to collect cost data separately. This is a great benefit for DCAA auditors and makes their job easier, but in an industry where volume production is the key to yield improvement, manufacturing expertise and rapid cost reduction, the government is paying a high premium for separate facilities, low volumes and no incentive for efficiency improvements.

Discussion of Impact #2:

Criminalization of the procurement process relative to accounting judgements and regulatory interpretations is limiting the number of qualified suppliers willing to participate in DoD business. The increased volume of contracts which must be monitored due to the threshold for certified costs at the $100K level, is resulting in new and inexperienced auditors continually being rotated through our companies. They are trained in government job cost accounting practices which are not practical for our commercial industry.

Semiconductor electronics is a highly capitalized and automated manufacturing operation, with process accounting systems based on high overhead with very little direct labor. Inexperienced auditors are continuely trained by our finance departments for months before they understand our complex accounting methods. The fact that these auditors are then in positions to interpret defective pricing, and make allegations which may lead to financial adjustments, and prosecution is causing many companies to re-evaluate their desire to participate

in federal contracts if cost must be certified. The trade statistics gathered by SIA show that the U.S. market for military semiconductors is currently 3% of the worldwide semiconductor market and is projected to drop to less than 2% by 1992. It makes no business sense to risk legal liability and jeopardize company reputation for a market segment which represents only 3% of the world marketplace, and is declining.

Discussion of Impact #3:

The burden of current defense acquisition practices is limiting the number of suppliers of new semiconductor technologies who can participate in government business. This will delay the insertion of the latest technological innovations into military systems. This is a serious threat to our military strength. The successes in our industry continue to find their beginnings in entrepreneurial start-ups with lean budgets, based on private investors and venture capital funds. In our highly competitive environment, new products addressing niche applications have brought rapid technological changes in the commercial electronics world. The DoD should benefit in the potential for performance and quality improvements, shorter time to market capabilities and lower costs. However, these niche companies do not have the luxury of even thinking about incurring the costs necessary to put the systems and infrastructure in place to comply with government cost accounting standards. In today's world where company strategies require the flexibility to subcontract most manufacturing operations all over the world, the new wave of electronics companies may never be able to comply with DoD cost and pricing requirements. Even more alarming is that 5 out of the top 10 U.S. semiconductor companies either will not accept government business if certified cost data is required, or can only comply with this requirement on a limited portion of their business. The significance of the

administrative, record keeping, audit costs and in many cases, segregation of costly facilities to provide cost data on $100K contracts, interpreted to be "sole source" is causing many semiconductor companies to reconsider their decisions to continue to accept business under these conditions. The net effect of all this is that more and more technology selections are being based not on who has the best product solution, but who can do the paperwork. At the $100K contract level, the ability to take advantage of a new innovation is a major hurdle to technology insertion. At the $500K level, this problem is almost non-existent at the design-in and preproduction phases of a military system, and relieves a huge burden from the commercial electronics subcontractor.

Discussion of Impact #4:

The requirement to submit estimated costs derived from an government cost accounting system that complies with CAS represents a heavy administrative burden at the $100K contract level, requiring an accounting infrastructure which is without use in our commercial businesses.

Most semiconductor companies can reasonably estimate the additional cost over their commercial product, of the differences required for defense devices, such as added environmental screening, testing and documentation. However TINA, in conjunction with CAS requires that these cost be accumulated separately. The result is that a complex accounting apparatus is required to be imposed on 100% of the company to account for less than 10% of the business.

The immediate result is higher cost to the manufacturer and higher prices for defense business. To illustrate these costs, one of our member companies has been working on installing a compliant cost accounting system in its military products operation only. The tab for this has already reached the $4

Million level and estimates for yearly maintenance costs are $1.6M. Multiply that across the semiconductor industry and you will come up with a $50M to $80M in yearly maintenance cost, just to comply with paperwork. This accounting mechanism contributes no value to the products we manufacture and makes us less competitive overall. This competitiveness in today's world market environment is critical to our industry's survival, and the health of our U.S. industrial base.

Discussion of Impact #5:

The current cost system creates financial and resource disincentives which our industry's profit margins cannot absorb. Increasing the threshold limit from $100K to $500K would eliminate 2/3 of the government's accounting, audit and paperwork trail for semiconductor companies who are trying to comply with the present acquisition system. In 1984, the previous threshold of $500K was reduced to $100K, which brought the threshold back to 1962 levels. $100K didn't buy very much in 1984. It buys far less in 1990. There are other major changes which have also taken place since 1984. The DoD's influence on technology development and production is declining. The advantage of penetrating the military marketplace because it is stable and typically anti-cyclical to commercial trends, is no longer a valid condition for entering the business. Although the DoD may be the largest Federal purchaser of high technology products, they represent only 3% of the total revenues of the semiconductor industry. Our peacetime defense budget will further lower this percentage. The return on investment on defense programs is also declining. To put this in perspective, the semiconductor revenues from U.S. defense contracts in 1989 was $1.5 Billion. The top 10 U.S. semiconductor companies spent over $2.8 Billion in capital equipment, and $2.9 Billion in private Research and Development.

We are in heavy competition with worldwide component manufacturers for a $13.3 Billion commercial U.S. semiconductor market, a $9 Billion European market, a $19 Billion Japanese market and a $5.8 Billion Asia/Pacific market. We believe this competition is healthy for all concerned. The DoD continues to emphasize its desire to maximize competition in its acquisition policy and increase the use of commercial business practices. We would like to see this implemented by passage of the Defense Management Improvement Act, including the increase in the TINA threshold. The Defense Department's continued need to regulate every procurement at the $100K level will make any semblance of commercial acquisition practices an impossibility. In addition, the benefit that the $100K threshold is protecting the government is overstated. The government is only protected if it goes back and performs post award audits on contracts between $100K and $500K. No amount of additional auditors will ever be able to accomplish this in a cost effective manner, and the DCAA will logically continue to allocate its resources to larger dollar value contracts. Finally the current government acquisition policy places industry in a confrontational position on government contracts to either accept the burden of the Federal Cost Accounting system, or don't do business with the government. The DoD has to recognize that the impact of this latter decision has nowhere near the impact on industry today that it did in 1984.

The semiconductor industry is typically a third tier supplier of components to defense equipment. Unlike prime contractors, semiconductor firms communicate primarily with Original Equipment Manufacturers (OEMS) and not with the end customer, the Department of Defense. Therefore, we suspect that many of you have had little contact with our industry; but we cannot be discounted. It is accurate to say that there is not a military aircraft which could fly, a satellite which could

communicate back to earth, a radar system which could readily identify an unfriendly target nor a Nintendo game which would keep your kids out of your hair for hours, without the technology innovations our industry has developed and integrated into everyday life. Our technological superiority has been the envy of nations throughout the world. We intend to persist in the same entrepreneurial spirit which fostered these leaps in technology and will challenge our Research and Development Labs to develop new products which will continue to keep us world leaders. We want that same superiority reflected in our military systems, as we are sure you do.

Let us again try to bring some of this high tech stuff closer to home. The Nintendo game has just been released with 16 bit microprocessor computing power. This evolution took place in a few short years. The mainstay of most military computers and processors is the 16 bit microprocessor. Nintendo is working on a 32 bit version. The military is working on qualifying a 32 bit processor. If the first manufacturer capable of offering a 32 bit microprocessor to military specs cannot do certified cost data, you will be able to witness newer technology in your kid's Nintendo game, than you will see in your newest military processors.

No matter what we do in our professional lives, as citizens and tax payers, we deserve better than this and should demand world leadership for our defense dollars, not more paperwork and inexperienced auditors. Passing the Defense Management Improvement Act which allows for commercial acquisition practices where practical, allows the Contracting Officer to exercise judgement on best value to the Government, and raising the TINA threshold to $500,000 will still not solve all of our government acquisition problems, but relieving over 2/3 of the actions is certainly a step in the right direction. The Semiconductor Industry Association requests your endorsement of this legislation.

## SEMICONDUCTOR INDUSTRIES ASSOCIATION

## GOVERNMENT PROCUREMENT COMMITTEE MEMBERS

Advanced Micro Devices, Inc.
Sunnyvale, CA

AT&T Microelectronics
Berkley Heights, NJ

Harris Semiconductor
Melbourne, FL

Intel
Chandler, AZ

Lansdale Semiconductor, Inc.
Tempe, AZ

LSI Logic Corporation
Fremont, CA

Micron Technology
Boise, ID

Motorola
Tempe, AZ

National Semiconductor
Santa Clara, CA

Precision Monolithics
Santa Clara, CA

Rockwell International
Newport Beach, CA

SGS Thomson
Microelectronics Inc.
Carrollton, TX

Signetics
Sunnyvale, CA

Texas Instruments
Midland, TX

United Technologies
Microelectronics Center
Colorado Springs, CO

VLSI Technology, Inc.
Tempe, AZ

SMALL BUSINESS LEGISLATIVE COUNCIL

**Statement to**
**Subcommittee on Defense Industry and Technology**
**Committee on Armed Services**
**United States Senate**

**on**
**Implementation of the Defense Management Review Report**
**and**
**S.2240, the "Defense Management Improvement Act"**

The Small Business Legislative Council (SBLC) is a permanent, independent coalition of over 100 trade and professional associations that share a common commitment to the future of small business. Our members represent the interests of over four million small businesses in manufacturing, retailing, distribution, professional and technical services, construction, transportation and agriculture. A list of SBLC members is attached.

SBLC is seriously concerned about the potential impact of the implementation of the Defense Management Review Report, as well as the enactment of S.2240, the "Defense Management Improvement Act" on small businesses. Among our principal concerns are an apparent lack of understanding of the differences between public purchasing procedures and commercial buying practices; the apparent drive for additional statutory changes, when, in our opinion, most problems have been caused by implementation; and the increased aggregation of contracts which discourages small business participation at both the prime and subcontractor levels

**Public Purchasing and Commercial Practices**

In SBLC's view, public purchasing procedures must be recognized as distinct from commercial buying practices. This principle is founded, in part, by the fact that public purchases are funded by all taxpayers, individuals and businesses alike. Public purchasing processes, therefore, must be open and fair, permitting participation by all qualified competitors capable of

meeting the Government's needs.

This does not mean that SBLC believes that the Government's purchasing procedures cannot be made more like commercial buying practices. SBLC supports simplification of the procurement processes. In addition, SBLC supports contract solicitation procedures that emphasize the balancing of price considerations and quality considerations, but in the most objective manner possible.

**Discipline of DOD's Regulatory System Not Statutory Change Is the Real Key to Acquisition System Improvement**

In the view of the small business community, no persuasive case has been made that the basic statutory framework for the implementation of the federal procurement process, such as the Competition in Contracting Act, is an impediment to the conduct of acquisition activities by DOD or the civilian agencies. Rather, SBLC steadfastly maintains that the procuring agencies, especially DOD, have imposed layers of unnecessary regulations. This is especially true of the military services and the individual buying activities.

On September 29, 1989, the Council on Defense and Space Industries Associations (CODSIA) submitted to DOD a 49-page set of recommendations as to how the FAR and DFAR might be improved. These changes would benefit government contractors of all sizes. It is our understanding that no action has been taken, and that DOD's planned "re-draft" of the DFAR will not address substantive issues. This, in our opinion, shows a reluctance on the part of DOD to truly review and reform its purchasing procedures.

Contractors of all sizes are plagued by non-standard contract clauses, procedures, and practices used by individual buying activities. The OSD DMR staff is reported to have identified some 11,400 non-standard contract clauses. These materials have not been subjected to public review and comment as required by Section 22 of the Office of Federal Procurement Policy Act. They have not been approved by DOD as deviations

from the FAR or DFAR.

SBLC strongly believes that action should be taken by DOD, or need be the Congress, to address this most persistent of problems.

**Aggregation of Contracts Discourages Small Business Participation at Both the Prime and Subcontractor Levels**

As the procurement work force has decreased, DOD has aggregated more and more contracts into single contracts. SBLC first observed this trend in construction; now it has become common practice in spare parts as well as other types of procurement. This trend can do nothing but discourage the participation of small businesses in DOD's procurement process.

It is a given that the larger the contract, the less likely it is that a small business will win its award. Larger prime contracts also mean larger subcontracts, which also discourage competition by small businesses. Experience has shown that even with the protections afforded by Public Law 95-507, small businesses frequently are excluded from subcontracting opportunities.

**Comments on S.2440, the "Defense Management Improvement Act"**

-- **Section 201 (Multiyear Contracting Enhancement)**

Program stability is as important to the many tiers of subcontractors and suppliers as it is to the prime contractor and the military service making the procurement.

--**Section 202 (Commercial style acquisition practices)**

SBLC is deeply concerned about the "blank check" character of this proposal. The intent of the provision clearly seems to be to severely limit the generally "open and fair" public purchasing system that currently exists, and which SBLC supports. The provision would suggest that the proposed "commercial-style" acquisition system contemplates:

- limitations on the participation of all qualified offerors;

- "prequalification" of offerors, by other than the procedures currently authorized by statute;
- potential elimination of justification and approval processes, and other internal checks, on noncompetitive procurements;
- severe limitations on access to bid protest procedures at GAO and the GSA Board of Contract Appeals;
- limitations on existing programs to foster participation by small business concerns as prime contractors and subcontractors;
- other unspecified limitations on existing protections for government contractors, such as the Prompt Payment Act, the Contract Disputes Act, and the Brooks Law.

**--Section 204 (Awards without discussions)**

SBLC maintains that any modification to CICA must assure that contract awards will be made in accordance with the announced evaluation criteria. SBLC suggests that solicitation procedures should precisely specify the relative importance of the various evaluation criteria.

**--Section 205 (Procurement simplification - uniform threshold for various socio-economic requirements)**

SBLC supports establishing the current "small purchase" threshold ($25,000) as the threshold for the application of the various socio-economic requirements. However, SBLC is concerned about the provision of the bill which would permit these thresholds and the small purchase threshold to be changed by independent legislative action relating to section 2304(g)(2) of title 10 and section 303(g)(2) of title 41.

**--Section 206 (Federal Acquisition Regulatory Council)**

SBLC suggests that the emphasis be on making the FAR Council an operating entity undertaking the important functions contemplated rather than allowing the Under Secretary of Defense for Acquisition to send a designee.

**--Section 208 (Certified cost or pricing data threshold)**

Small business government contractors are prepared to stand behind their prices or cost proposals through certification that they are current, accurate, and complete. However, small businesses have severe difficulty with the requirements relating to the data required to be submitted in support of that certification. They also are harmed by the delays for the pre-award audits that have flowed from the certification requirement. Again, these are problems of management, not statute.

**--Section 217 (Pilot program for major defense acquisition programs)**

SBLC questions the "blank check" character of this proposal. While it is clear that no small business concern would be a prime contractor under a major management system program covered by the pilot program, the effects on the many subcontractors and suppliers remain unclear. Indications are that the DOD staff proponents of this provision intend that the selected programs would be free of all current requirements relating to subcontracting. Obviously, many of these requirements are important to small business subcontractors and suppliers. They also should be important to DOD and the prime contractors, since the subcontractor and supplier base is the foundation for the defense industry and technology base, and is showing the increasing clear signs of severe erosion.

**--Section 218 (Davis-Bacon Reform)**

SBLC supports reform of the Davis-Bacon Act. The inclusion of this provision will, as Secretary Cheney said in his letter of transmittal, "increase the efficiency and effectiveness of our activities and reduce the size and costs of our defense structure."

[Whereupon, at 10:45 a.m., the subcommittee was adjourned.]

# APPENDIX

- DoD's July 1989 Defense Management Report
- DoD's January 1990 Implementation Progress Report
- S. 2440, the Defense Management Improvement Act, along with the Department's letter of transmittal and sectional analysis
- DoD's White Paper on the Congress
- DoD's press statements related to the foregoing documents
- DoD's responses to the prehearing questions.

# DEFENSE MANAGEMENT

## Report to the President

by
Secretary of Defense
Dick Cheney

July 1989

# Defense Management

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THE SECRETARY OF DEFENSE

WASHINGTON, THE DISTRICT OF COLUMBIA

June 12, 1989

The President
The White House
Washington, D.C. 20500

Dear Mr. President:

I am pleased to submit the Report of the Defense Management Review conducted pursuant to your direction in National Security Review 11. This Report is the product of extensive study and sets forth the plan you requested to:

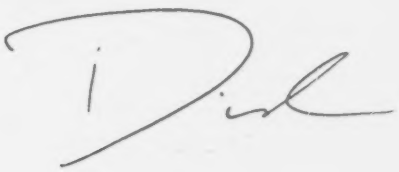
-- implement fully the Packard Commission's recommendations;

-- improve substantially the performance of the defense acquisition system; and

-- manage more effectively the Department of Defense and our defense resources.

With your approval, the Department is prepared to embark immediately on the implementing actions identified in the Report. Some of these actions will require the assistance of other executive branch agencies. The most important will require the cooperation of the Congress. All will demand the Department's sustained attention and diligent effort in the years ahead.

Sincerely,



# DEFENSE MANAGEMENT

## I. INTRODUCTION

In his February 1989 address to the Joint Session of Congress, the President announced that he was directing the Secretary of Defense to develop "a plan to improve the defense procurement process and management of the Pentagon." Terms of reference provided by the President called upon the Department of Defense (DoD) to:

> ***develop a plan to accomplish full implementation of the recommendations of the Packard Commission and to realize substantial improvements . . . in defense management overall.***

For these purposes, the President directed that specific actions be identified in four broad areas--personnel and organization, defense planning, acquisition practices and procedures, and government-industry accountability. The President also called for recommended "actions the Congress could take which would contribute to the more effective operation and management" of DoD.

The Defense Management Review has examined the various efforts made to date to realize the far-reaching improvements envisioned both by the Packard Commission in its Reports and by Congress in the Goldwater-Nichols Defense Reorganization Act of 1986. It has benefitted from the information provided and views offered by senior civilian and military officials throughout DoD, as well as the valuable insights of numerous outside organizations and experts who have monitored the course of recent defense reforms.

While some progress unquestionably has been made since 1986, there is no basis for complacency. On the contrary, redoubled efforts will be required in order to realize improvement to the degree contemplated by the Packard Commission and the Goldwater-Nichols Act. But the progress to date does give cause for hope that the necessary consensus and commitment can be sustained in the coming years. This will be essential if the U.S. defense effort is to be managed in a manner that:

- ensures the continued strength and readiness of the nation's Armed Forces;
- helps us acquire needed new weapon systems at less cost, in less time, and with greater assurance of promised performance;
- encourages industry and government alike to meet the highest standards of integrity and performance;
- and promotes greater public confidence in our stewardship of defense resources.

The dimension and importance of the task cannot be overstated. The course of international affairs in the years ahead promises to test U.S. leadership in new

and unforeseeable ways. Potential threats to the security of the U.S. and its Allies are likely to diminish in some areas while increasing in others, may well take new and more subtle forms, and undoubtedly will necessitate U.S. military forces that are modern, ready, and sustainable in a variety of contingencies. At the same time, as a result of competing national priorities, the real resources available for defense in the early 1990s are likely to be less than in recent years. If we are to continue to protect our global interests, meet our responsibilities, and minimize the risks to our security, we must preserve essential military capabilities through ever more skillfull use of the resources at our disposal.

Such circumstances compel the utmost attention to prudent management of our defense program--and oblige the Executive branch, Congress and industry, as seldom before, to join in husbanding available defense dollars, cutting unnecessary costs, and achieving new levels of productivity and quality.

Building on recent efforts, in light of experience and current circumstances, this Report is intended to articulate an overall approach for achieving these important objectives and to identify a series of specific management initiatives for the President's consideration. Many of these initiatives can be undertaken on the authority of the Secretary of Defense. Some will require concerted action by the Administration, including other Executive departments and agencies. Still others -- among them actions that hold the greatest promise for long-term improvement -- will require the support of Congress and the defense industry. Together, these initiatives respond to the findings and conclusions of the Packard Commission and to the provisions of the Goldwater-Nichols Act, and speak to their as-yet-uncompleted agenda for constructive change.

None of the additional steps recommended by the Defense Management Review departs from the course already charted for DoD, but likewise none represents a quick fix. The harder part of the job remains to be done -- and the larger improvements are yet to be realized. Nothing less than an unreserved and long-term commitment on the part of DoD will be necessary to meet the President's objectives. Nothing less than sustained cooperation between the Administration and Congress, and between government and industry, will suffice for that purpose.

## II. MANAGEMENT FRAMEWORK

The overall framework adopted for decisionmaking within DoD must reflect sound management principles if the President and Secretary of Defense are to be well served. The management framework that follows has been guided by several fundamental principles:

- The individual responsibilities of senior managers must be well understood.

- Managers must be given a range of authority commensurate with their responsibility.
- Subject to final decision by the President, the Secretary, or the Deputy Secretary, managers' participation in the process of establishing central policies should be encouraged.
- Approved policy, including longer-term priorities and objectives for the defense program, must be widely and clearly communicated within DoD.
- Within this context, managers must expect to be held strictly accountable for the overall results of their efforts, for adhering to approved policy, and for executing decisions.
- The full talents, dedication, experience and judgment of all DoD employees must be brought to bear in the execution of their diverse missions. Policy must be implemented in a wide variety of settings, and the process by which this is done must be carefully monitored in order to take full advantage of opportunities for cost savings and quality improvement. Innovation will come most naturally from the military and civilian professionals entrusted to do the job. They must be encouraged to examine and improve continuously the processes in which they are engaged -- and to raise, at all levels, new ideas and approaches that will contribute to a sound, affordable program to maintain adequate U.S. military strength.

The current broad division of responsibilities among the Office of the Secretary of Defense (OSD), the Office of the Chairman of the Joint Chiefs of Staff (CJCS), the Unified and Specified Commands, the Military Departments, and the Defense Agencies provides a generally sound structure within which to implement these principles. The essential challenge is one of integrating their respective efforts more effectively. This will depend heavily upon certain key senior officials, some aspects of whose responsibilities bear emphasizing.

**The Deputy Secretary of Defense** will assist the Secretary in overall leadership of DoD and exercise authority delegated by the Secretary on all matters in which the Secretary is authorized to act. He will be responsible for day-to-day management of DoD and operation of a more rigorous Planning, Programming, and Budgeting System (PPBS) designed to produce a coherent, integrated, and efficient defense program. He will have day-to-day responsibility, with the Secretary, for ensuring the full implementation of approved actions under the Defense Management Review.

**The Under Secretary of Defense for Acquisition** (USD/A) will exercise the authority intended by the Packard Commission and provided in law. Under the direction of the Secretary and Deputy Secretary, the USD/A will be responsible for policy, administration, oversight and supervision regarding acquisition matters DoD-wide. In this regard, the USD/A's authority will extend to directing the Secretaries of the Military Departments on the manner in which acquisition responsibilities are executed by their Departments. The USD/A will

have the full confidence and active support of the Secretary and Deputy Secretary as their principal staff assistant on such matters, including implementation of numerous initiatives stemming from the Defense Management Review. The USD/A's role within DoD will be enhanced in certain respects, among them the following: the USD/A will be a key participant in all phases of the PPBS, including deliberations on major budget issues; and will administer the Selected Acquisition Reports (SARs) and other Congressional reporting on acquisition programs and issues.

**The Secretaries of the Military Departments,** under the Secretary's and Deputy Secretary's direction, will be responsible for managing the affairs of their Departments as provided in law, including front-line implementation of many of the initiatives identified in the Management Review as well as other policy, program and budget decisions. As key advisers to the Secretary and Deputy Secretary, they will provide candid personal views as well as convey the institutional perspective of their Departments. Collectively, they will be charged with helping to coordinate the activities of the Military Departments in the interest of more efficient management of the overall defense program.

**The Under Secretary of Defense for Policy** (USD/P), among his other responsibilities, will support and represent DoD, as directed by the Secretary and Deputy Secretary, on foreign relations and arms control matters. In addition, the USD/P will serve as the Deputy Secretary's primary advisor for the planning phase of the PPBS, and as a key participant in programming and budgeting decisions as well. In accordance with the Goldwater-Nichols Act, and in order to strengthen the ties between national policy and plans, the USD/P and a select element of his staff will assist the Secretary and Deputy Secretary in developing guidance for, and in reviewing, operational and contingency plans for nuclear and conventional forces.

**The Chairman of the Joint Chiefs of Staff** (CJCS) was vested by the Goldwater-Nichols Act with critically important responsibilities for planning, advising, and policy formulation. In keeping with his functions as principal military advisor to the President and the Secretary of Defense, and as spokesman for the Joint Chiefs of Staff (JCS) and the Commanders-in-Chief of the Unified and Specified Commands (CINCs), the CJCS will advise the Secretary and Deputy Secretary on the full range of issues and participate in senior councils within DoD.

The foregoing descriptions are not exhaustive, but rather intended to highlight important roles that the Deputy Secretary, USD/A, Secretaries of the Military Departments, USD/P, and CJCS will play as core managers within DoD. Sound working relationships and regular communications among these and other senior officials are indispensable to managing DoD successfully; to ensuring that it responds to the President's and Secretary's priorities; to assisting the Secretary and Deputy Secretary as they are called upon to make major policy, program and

budget decisions; and to guaranteeing prompt and effective execution of those decisions. For these purposes, DoD will rely on several major intradepartmental groups whose broad responsibilities and functions are described below.

**DoD Executive Committee.** Under the Secretary as chairman, the Deputy Secretary, USD/A, Secretaries of the Military Departments, USD/P, and CJCS will comprise the membership of a new Executive Committee. The Executive Committee will meet regularly and serve as the key, senior deliberative and decisionmaking body within DoD for all major defense issues. In order to promote the candor and confidentiality of the Executive Committee's deliberations on the most important and difficult issues, the Executive Committee's membership will be strictly limited. The DoD General Counsel will attend meetings of the Executive Committee as a legal advisor and observer. The participation of other DoD officials will be subject to the Secretary's approval, on a case-by-case basis. The Executive Committee will assume continuing responsibility for, among other things, reviewing and expediting the implementation of measures approved by the President as a result of the Defense Management Review. The Special Assistant to the Secretary and Deputy Secretary will serve as Executive Secretary of the Executive Committee.

**Defense Planning and Resources Board.** The Deputy Secretary will manage a revitalized Planning, Programming and Budgeting System (PPBS) as chairman of a Defense Planning and Resources Board (DPRB). The DPRB will replace the current Defense Resources Board. The DPRB will have the following permanent members: CJCS, USD/A, the Secretaries of the Military Departments, USD/P, the Assistant Secretary of Defense (Program Analysis and Evaluation), and the DoD Comptroller. As matters on the agenda of the DPRB dictate, other senior military and civilian officials will be called upon to participate in its deliberations --including, as appropriate, the Service Chiefs, CINCs, and representatives of other OSD offices. Representatives of the Director of the Office of Management and Budget and the Assistant to the President for National Security Affairs will participate in the DPRB on a regular basis. The Deputy Secretary will appoint a single individual from within his office as the Executive Secretary of the DPRB. Through the DPRB, the Deputy Secretary will help to develop stronger links between our national policies and the resources allocated to specific programs and forces.

**Planning Process.** Responding to the Packard Commission's recommendations and the mandate of the Goldwater-Nichols Act will require substantial improvements in the threshold or planning phase of the PPBS. Under the pressures of the annual budget cycle, consideration of broad policies and development of guidance on high-priority objectives all too often has been neglected, and decisions made instead on a short-term, issue-by-issue basis not well-suited to optimizing the use of available defense resources. As a result, DoD's principal planning product, the Defense Guidance, now represents at best an early,

negotiated settlement on the content of the Service and Defense Agency programs.

Redressing this situation will require a major effort by the DPRB, including continued development of a biennial budget process consistent with the Packard Commission's recommendations, in order to achieve better long-range planning and greater stability in the defense program.

In the spring of the year prior to DoD's program and budget reviews, the Secretary, on the advice of the DPRB, will issue guidance on a limited number of planning topics to be considered and resolved. In addition, the Secretary may wish to issue alternative planning scenarios to be considered. The DPRB, or a select group of its members designated by the Deputy Secretary, will meet through the spring and summer to develop recommendations on these issues for consideration by the Secretary before August 1, and for subsequent communication to the Military Departments and Defense Agencies.

The USD/P will include these and other issues as specific planning guidance in the restructured Defense Planning Guidance (DPG), which the Secretary will formally issue by October 1 in the year preceding the programming phase. In addition to the planning issues provided by the Secretary and military strategy provided by the CJCS, the DPG will contain:

- a dramatically shortened and more concise section on forces, incorporating only a limited set of high-priority "Program Planning Objectives" that will be mandatory guidance to the Services and Defense Agencies;
- broad identification of the projected impact of these objectives on future funding;
- and a rough, 20-year "road map" of the modernization needs and investment plans of DoD, projecting the impact of the Program Planning Objectives, and of additional modernization or replacement of major systems (e.g., ships, aircraft, tanks and satellites) expected by the Military Departments and Defense Agencies, against realistic levels of future funding.

**Defense Acquisition Board.** The USD/A and the Vice Chairman of the JCS (VCJCS), as chairman and vice-chairman respectively, will direct the efforts of a streamlined Defense Acquisition Board (DAB). The DAB's permanent membership will be reduced, as will its committee and ad hoc working structures. The USD/A will expedite the implementation of decisions following DAB deliberations.

The DAB will rigorously oversee major systems acquisition, to ensure that the acquisition process is managed in a manner consistent with DoD policy. That policy will define minimum required accomplishments, and permit additional

program-specific exit criteria to be established by the USD/A, at each Milestone in a system's life. The paramount objective of the USD/A will be to ***discipline*** the acquisition system through review of major programs by the DAB. This review will be calculated to ensure that every program is ready to go into more advanced stages of development or production prior to receiving Milestone approval, and that the plans laid for such stages are consistent with sound acquisition management.

In order to forge strong links between the DPRB and the DAB, the USD/A will serve as a key advisor to the Secretary and Deputy Secretary on resource decisions affecting acquisition program baselines, including the cost, schedule and performance of all major systems.

By August 1, 1989, the USD/A and DoD Comptroller will submit their recommendations to the Deputy Secretary concerning the assumption by the DAB of responsibility for major automated data processing systems acquisition currently exercised by the Major Automated Information System Review Council (MAISRC).

**Joint Requirements Oversight Council.** To assist the USD/A and the DAB, the Joint Requirements Oversight Council, chaired by the VCJCS, will assume a broader role in the threshold articulation of military needs and the validation of performance goals and baselines for all DAB programs at their successive Milestones. (This expanded role is more fully described below, in the Defense Acquisition section of this Report.)

**Coordinating Committees.** In addition, three Assistant Secretary-level Committees will be established to improve internal coordination on arms control, technology transfer, and conventional force readiness and related issues. The arms control committee will be chaired by the Assistant Secretary of Defense (International Security Policy). Representatives of the USD/P and USD/A will serve as chairman and vice-chairman, respectively, of the technology transfer committee. These committees will report to the Deputy Secretary through the USD/P. The conventional force readiness committee will be chaired by the Assistant Secretary of Defense (Force Management and Personnel), and will report to the Deputy Secretary. In each case, committee membership will include representatives, as appropriate, of other OSD offices, the CJCS, and the Military Departments.

## III. DEFENSE ACQUISITION

The terms of reference provided by the President for the Defense Management Review focused principally on the defense acquisition system. Major challenges remain to be addressed if DoD is to implement fully the Packard Commission's

recommendations in this area, including the various organizational arrangements, personnel improvements, and revised practices and procedures projected by the Commission to reduce the cost and improve the performance of new weapon systems. Efforts to date have not produced the tangible results envisioned by the Commission. This is indicative of the dimension of the problems the Commission identified, the far-reaching solutions it offered, and the persistence required if DoD's management of major acquisition programs is to emulate the characteristics of the most successful commercial and government projects. Among these characteristics, described in the Commission's reports, were:

- **Clear Command Channels**--the clear alignment of responsibility and authority, preserved and promoted through short, unambiguous chains of command to the most senior decisionmakers;
- **Program Stability**--a stable environment of funding and management, predicated on an agreed baseline for cost, schedule, and performance;
- **Limited Reporting Requirements**--adherence to the principle of "management by exception," and methods of ensuring accountability that focus on deviations from the agreed baseline;
- **Small, High Quality Staffs**--reliance on small staffs of specially trained and highly motivated personnel;
- **Communications with Users**--sound understanding of user needs achieved early-on and reflecting a proper balance among cost, schedule, and performance considerations;
- **Better System Development**--including aggressive use of prototyping and testing to identify and remedy problems well before production, investment in a strong technology base that emphasizes lower-cost approaches to building capable weapon systems, greater reliance on commercial products, and increased use of commercial-style competition.

When considered in this framework, it is apparent that the Packard Commission's recommendations intended to make more fundamental changes in the defense acquisition system than have yet been accomplished. Additional actions are required--including steps that substantially depart from or go well beyond DoD's and Congress' efforts to date.

***Clear Command Channels***

Positioning the USD/A as DoD's senior, full-time acquisition executive, with the variety of important functions already described, was but one part of the Commission's approach to acquisition management. No less central to its conception was the establishment of clear, abbreviated lines of authority within the Services for performance of their traditional role in managing major programs. In each of the Military Departments, management responsibilities were to flow through an experienced, full-time Service Acquisition Executive (SAE), administering Service programs within policy guidance from the USD/A; through Program Executive Officers (PEOs), as key middle managers responsible

to the SAEs for defined and limited groups of major programs; to individual Program Managers (PMs), vested with broad responsibility for and commensurate authority over major programs, and reporting for these purposes exclusively to their respective PEOs. The intent was to confine management accountability within this greatly streamlined chain of command, which was intended to capture ***all*** cost, schedule and performance features of all major programs.

The Military Departments have taken different approaches to implementing the Commission's concept, and have had varying degrees of success. None has fully met the Commission's purposes, and a careful review of their efforts to date indicates a need for revising their acquisition organizations in several respects.

- **Service Acquisition Executives.** A single civilian official, at the Assistant Secretary-level within each Military Department, will be designated the SAE. The SAE will have full-time responsibility for all Service acquisition functions. These functions will be conducted within Service Secretariats in a manner that ensures effective civilian control, and will not be duplicated in Service Chiefs' organizations.
- **Program Executive Officers.** Within each Military Department, the SAE will manage all major acquisition programs through PEOs, each of whom will have a small, separate staff organization and devote full-time attention to management of assigned programs and related technical support resources. PEOs will be relieved of other responsibilities.
- **Program Managers.** On all matters of program cost, schedule and performance, PMs will report only to their respective PEO or SAE.
- **Systems and Materiel Commands.** Consistent with this structure, these Service commands will be organized with a primary focus on three roles: providing necessary logistical support; to the extent appropriate, managing programs other than those conducted under the PEO structure; and providing a variety of support services to PEOs and PMs, while duplicating none of their management functions. The Secretaries of the Military Departments and SAEs will be charged with ensuring that Service commands perform these various roles in a fully accountable manner.

The Secretaries of the Military Departments and Service Chiefs will ensure maximum accountability within the PEO structure. PEOs will be selected by the Secretaries of the Military Departments, with the advice of SAEs who will have primary responsibility for evaluating PEOs' job performance. Similarly, SAEs and PEOs will advise on the selection of PMs and evaluate them. In addition, funding and personnel authorizations for PEO offices, and those of the PMs reporting to them, will be administered separately from Service commands.

Secretaries of the Military Departments will submit detailed plans for implementing these changes for the Secretary's consideration by October 1, 1989.

This approach promises to streamline and strengthen the management of major systems acquisition within the Military Departments. It has important consequences at several levels. It tends to fix responsibility and define authority more clearly , and thus sharpen accountability. It should help relieve PMs of requirements for repetitive reviews by and reports to Service command layers. It will vest PEOs with a more active management role -- one performed separately from such commands and hence less susceptible to being defined by the bureaucratic dynamics of those large organizations.

This approach also highlights collateral aspects of the Commission's recommendations -- notably those that relate to the elimination of duplicative or unnecessary functions and management layers and to the achievement of substantial reductions in overall staffing. In this connection, the Packard Commission clearly anticipated that implementation of its recommendations within the Services would occasion a broader streamlining of headquarters and management organizations, and more substantial personnel reductions than have yet been accomplished. As discussed below, the Secretary of Defense will direct the Secretaries of the Military Departments to implement this management chain of command with these larger purposes in mind. Streamlining of substantial magnitude is anticipated as a result of this effort by each Military Department.

***Stability in Programs***

The Packard Commission properly emphasized the important economies that flow from conducting major systems acquisition in an environment of stable funding and management. Reliable planning, funding, and system configuration, and continuity in management personnel, greatly increase the likelihood that systems will be delivered on time and at projected cost. Reaching and adhering to baseline agreement on factors critical to a program's success, contracting for procurements over two or more years, and maintaining economical rates of production--these and other techniques have been proven to yield substantial savings over the life of a system.

The expected budget environment will make it more difficult, but altogether more important, that DoD avail itself of these means to stretch its modernization resources. For this reason, the Deputy Secretary and the Secretaries of the Military Departments will ensure that the USD/A and the SAEs are more active participants in the program and budget cycles at both DoD and Service levels. These senior acquisition officials will serve as key advisors on resource decisions affecting the baselines of major acquisition programs, and on alternatives that may mitigate the impact of such actions.

To take greater advantage of potential savings through multiyear contracting will require a change in current law, which limits eligible procurements to those in which DoD can achieve demonstrated savings of 10 percent or more. This has

the anomalous result of excluding from multiyear consideration major procurements for which projected savings may be substantial in dollar terms even if marginally less than 10 percent of the contract cost. The Administration should seek to eliminate or reduce this threshold, in order to permit case-by-case evaluation of opportunities for cost savings through multiyear procurement. (See Appendix B to this Report.)

The Secretaries of the Military Departments and SAEs will promote continuity in the management of major programs. They will ensure that successful PMs enjoy a sustained tenure, ideally to direct their programs through an entire Milestone phase or for the four-year period set by statute. They will provide for an orderly transfer of responsibilities between PMs, and ensure that successful PEOs enjoy tenure of comparable duration.

***Limited Reporting Requirements***

Numerous reviews of the acquisition system, including the Packard Commission's, have found that the system is encumbered by overly detailed, confusing, and sometimes contradictory laws, regulations, directives, instructions, policy memoranda, and other guidance. Little room now remains for individual judgment and creativity of the sort on which the most successful industrial management increasingly relies to achieve higher levels of productivity and lower costs. Much of this stifling burden is a consequence of legislative enactments, and urgently requires attention by Congress. Much also has been administratively imposed and requires prompt corrective action by DoD.

To reduce the self-imposed burden, the Secretary will charter a joint OSD-Services task force to conduct a zero-based review of regulatory and other guidance to DoD's systems acquisition, procurement, logistics, and related activities, beginning first with DoD-level guidance and proceeding down through the Military Departments and their components. The review will include both existing guidance and that which is currently under development. The task force will also assess the processes by which guidance is developed, issued, and disseminated, and recommend changes to ensure that in the future such guidance is held to the minimum required. The task force will be assembled by the USD/A, and will complete its report to the Secretary not later than January 1, 1990. The task force effort will be governed by a ***strong*** presumption against retention or duplication of guidance, absent a clear and compelling need. The burden of establishing such a need will be placed on the proponent of the guidance in question. Special scrutiny will be given to guidance that imposes or occasions unnecessary costs in the acquisition process; that inhibits the implementation of sound procurement policies such as "best value" competitive practices and the buying of commercially-available products; that more narrowly confines the discretion of working levels than is required by law or sound

management control; and that imposes unnecessary reports and reviews on program offices and contractors.

The USD/A, with the SAEs, will establish a similar task force to review existing programs and initiatives for "advocacy" of special, single-purpose requirements (e.g., concerning packaging, transportation, maintenance, etc.) on program offices. The task force will be charged with developing a plan to eliminate as many of these advocacy programs as possible.

Inherent in the concept of limited reporting and review requirements is the principle of management by exception--i.e., intervention by senior management only at Milestone intervals, at a PM's request, or in the event that a program encounters substantial problems in meeting its baseline. In the 1987 Defense Authorization Act, Congress provided authority to DoD to designate a limited number of Defense Enterprise Programs (DEPs) to demonstrate the viability of this approach, and as candidates for milestone authorization. DoD should take better advantage of this special authority than it has to date. The USD/A, with the SAEs, will carefully select several new Defense Enterprise Programs from programs in the DAB's Concept Approval (post-Milestone I) phase, provide strong policy direction and oversight in implementing the DEP concept, and seek milestone authorization for such programs to enhance management stability.

***Smaller, Higher Quality Staffs***

**Toward A More Capable Workforce**

Approximately 580,000 civilian and military personnel in DoD spend all or a substantial part of their workday in the acquisition field--broadly defined to include research, development, procurement, logistics, distribution, and related maintenance activities. (See Appendix A to this Report.) Their collective efforts form a core part of the U.S. defense program, and much depends upon how efficiently and effectively they equip and supply our Armed Forces. As the Packard Commission pointedly observed:

> ***The defense acquisition workforce mingles civilian and military expertise in numerous disciplines for management and staffing of the world's largest procurement organization. Each year billions of dollars are spent more or less efficiently, based on the competence and experience of these personnel. Yet, compared to its industry counterparts, this workforce is undertrained, underpaid, and inexperienced. Whatever other changes may be made, it is vitally important to enhance the quality of the defense acquisition workforce -- both by attracting qualified new personnel and by improving the training and motivation of current personnel.***

While small improvements have been made in the nearly three years since the Commission completed work, its major recommendations have yet to be implemented. Identifying steps to accomplish the Commission's broad objectives, accordingly. has been a major focus of the Defense Management Review.

**On the civilian side** -- In the Navy's China Lake personnel project, DoD has proven the viability of a less rigid personnel management system. It also has demonstrated the clear advantages such a system offers to DoD employees and managers alike, including notable improvements in working environment, professional rewards, recruitment and retention. Although the Packard Commission strongly recommended that Congress authorize the Secretary to implement an alternative system of this sort for all critical acquisition personnel, such authority has not been forthcoming. During the 100th Congress, a measure that would have expanded the China Lake initiative to include up to 100,000 DoD employees was adopted by the Senate but not the House of Representatives. Expanded demonstration authority would be useful, but it is not enough. Accordingly, the Administration should seek to define a broader and permanent authority for the Secretary to set civilian acquisition personnel policies DoD-wide, on the understanding such authority will be exercised without increasing overall personnel costs otherwise incurred. (See Appendix B.)

DoD also will seek to increase the professionalism of its procurement workforce to make its employees' capabilities and career opportunities more competitive with those of their private sector counterparts. This will include actively supporting legislation recently proposed by the Office of Personnel Management (OPM) that would allow DoD to pay for degree-related course work by civilian personnel in critical procurement fields. (See Appendix B.) In addition, as the Packard Commission specifically recommended, the Secretary will seek prompt action by the Administration, through OPM, on classification of DoD contracting officers as a professional personnel series, and, in the case of those contracting officers who can commit DoD to more than $25,000 per contract, the adoption of classification standards that require an appropriate combination of relevant work experience and education.

**On the military side** -- The sophistication and complexity of military equipment continues to increase, as do the challenges implicit in developing, procuring and supporting such equipment. The need for military specialists to manage the acquisition process accordingly is now greater than ever, and will only grow over time. As the Packard Commission observed, each of the Services has made strides in managing its officer personnel to meet this challenge. Looking to the future, however, it is clear none of the Services has yet gone far enough.

Current arrangements reflect a not altogether satisfactory compromise of two valid, but directly competing interests. On the one hand, it is undeniably desirable that those who manage the acquisition system be highly attuned,

through personal experience in the operational world, to the needs of military users. On the other hand, if these needs are to be met in the successful development of major systems, it is increasingly imperative that acquisition managers possess a range of technical skills and a breadth of experience largely unavailable in operational assignments. It must be recognized that attainment by a military officer of equal competence for senior field grade and higher assignments in both the operational and acquisition arenas is increasingly difficult, and for many purposes impossible. New means must therefore be found to develop and retain the variety of necessary acquisition skills in the military, while at the same time ensuring that development of weapon systems reflects keen regard for operational realities.

For this purpose, the Secretaries of the Military Departments, working with the Service Chiefs and in consultation with the CJCS, will develop and submit for the Secretary's consideration, not later than October 1, 1989, plans for establishment of a dedicated corps of officers in each Service who will make a full-time career as acquisition specialists. These plans will be designed to facilitate the development of officers expert in such distinct sub-specialties as systems development, procurement and logistics. They will identify recommended means to ensure:

- selection of highly promising officers early in their careers;
- timely specialization in acquisition, including the election of such career paths by officers with some significant operational experience (not later than 10-12 years);
- assignment, other than in exceptional cases, to acquisition positions and related training once selected;
- creation of attractive and equitable career paths, including designation of corps-eligible positions;
- and assurance of promotion potential up to the highest flag grades.

So that user perspectives are preserved in the development of weapon systems, appropriate provision should be made for assignment of operational personnel to important supporting roles within program offices.

As part of these plans, the Secretaries of the Military Departments also will submit coordinated recommendations to the Secretary concerning specialized educational requirements and training opportunities for acquisition corps officers throughout their careers. At a minimum, these recommendations will address the designation of the Defense Systems Management College as an intermediate Service school; provision for advanced management and technical training, such as programs in universities and rotational assignments in industry; and establishment of a senior-level Service school, comparable to the National War College, with a specialized curriculum developed to train the most senior acquisition managers. In this regard, such recommendations should address the

rigor and quality of curricula, qualifications and compensation of permanent faculty, and support for scholarly research at DoD acquisition schools, as well as resources required for these purposes. They also should take account of the recommendations of the recently established National Defense University Transition Planning Committee on possible expansion of the mission of the Industrial College of the Armed Forces.

**In general** -- To ensure that DoD-wide training, education and career development policies concerning civilian and military acquisition personnel are developed and implemented effectively, the USD/A will establish within his organization a central office for such matters. With the USD/A, the Assistant Secretary of Defense (Force Management and Personnel) will develop and administer a central reporting system and data base on the composition and training of the acquisition workforce in the Services and other DoD components.

**Toward a More Efficient Workforce**

The Packard Commission concluded that implementation of its recommendations:

> ***should allow for a substantial reduction in the total number of personnel in the defense acquisition system, to levels that more nearly compare with commercial acquisition counterparts. Eliminating a layer of management by moving the functions and people of that layer to some other layer clearly will not suffice.***

The President directed DoD to "develop methods and rationale for reductions to improve efficiency and realize direct and indirect cost savings."

For these purposes, the Defense Management Review examined the "turnaround" of the largest private corporations that have realized dramatic, simultaneous productivity improvements and cost reductions. Many such corporations faced problems comparable to DoD's--including management structures, staffing levels, and entrenched corporate policies and cultures that impeded decisionmaking, frustrated innovation, obscured accountability for success and failure, and imposed excessive overhead costs. Private sector experience in overcoming problems of this sort demonstrates the utility of several related actions:

- identifying and eliminating unnecessary functions and management layers;
- concentrating on core functions performed at appropriate organizational levels;
- consolidating related functions where doing so will occasion greater effectiveness or efficiency;
- lowering overall costs, particularly through sizable reductions in management and other white collar personnel;

- and employing a variety of innovative techniques proven to motivate employees and suppliers and to achieve steady improvements in quality and overall performance.

Actions such as these are far more easily undertaken by corporate than DoD managers, who operate with differing objectives and under a variety of unique constraints. Nonetheless, private sector experience is instructive at many levels within the defense acquisition system. It teaches that the achievement of macro-efficiencies ***is*** possible over the long-term and should be a paramount objective of ***all*** -- in the Executive branch, Congress, and industry -- who play a role in U.S. defense efforts.

DoD and Congress have collaborated for these purposes recently in addressing the traditionally divisive issue of DoD infrastructure. As a result of the work of the Secretary's Commission on Base Realignment and Closure and companion legislation enacted in 1988, DoD will be able to achieve a more efficient base structure and greater mission effectiveness. Through strong management oversight of the closure and realignment process, DoD will seek to realize the full cost savings projected by the Base Closure Commission.

The Defense Management Review has identified a number of other measures that can and should be taken to achieve greater efficiency in its acquisition and related activities. In this context, substantial improvements must ultimately depend upon progress achieved across a broad front--including the establishment of a more capable acquisition workforce and of a statutory and regulatory environment that does not unnaturally limit its productivity. Nonetheless, a variety of nearer-term actions will be undertaken.

Revision in Service acquisition organizations to implement the Packard Commission's recommendations, as outlined above, will be part of a broader effort. This will involve the elimination of management layers and research, development and procurement-related functions that do not add clear value; a consolidation of related functions where possible; an overall improvement in the efficiency of DoD's acquisition management, logistics, distribution and related maintenance activities; and, by these means, a reduction of at least 15 percent (or approximately $7.5 billion) in the annual cost to DoD of such related functions by not later than Fiscal Year 1993, for an aggregate cost saving of $30 billion over the 1991-1995 Five Year Defense Plan. Such reduction will be implemented on a phased basis, beginning with DoD's Fiscal Year 1991 budget review.

To achieve these purposes, the Deputy Secretary will chair a special task force composed of the USD/A, the Secretaries of the Military Departments, the DoD Comptroller, and the Assistant Secretaries of Defense (Force Management and Personnel) and (Program Analysis and Evaluation). A detailed plan incorporating

the task force's recommendations will be submitted to the Secretary by October 1, 1989. The plan will provide for comprehensive review of management structures within OSD, the Military Departments and Defense Agencies, and of field and headquarters functions and operating processes, to meet the cost reduction goal and enable DoD to perform its acquisition and related missions with improved efficiency and effectiveness. Particular emphasis will be given to steps that reduce recurring payroll costs to DoD, whether incurred by direct hire or contract support. The plan will address, among other matters, the potential for increased productivity through broader implementation of OMB Circular A-76 (Performance of Contract Activities). It also will protect near-term funding for labor saving devices (e.g., upgrades in automated data processing capability) that will enhance productivity.

In addition, all DoD contract administration services (CAS), including those currently performed in the Defense Logistics Agency (DLA) and the Military Departments, will be consolidated under a newly-created Defense Contract Management Agency ( DCMA), which will report to the USD/A and be charged with more efficiently and effectively performing the CAS function. The USD/A will assist the Deputy Secretary in preparing a plan to establish the DCMA for the Secretary's approval by October 1, 1989. This plan will, among other things, seek to streamline existing CAS organizations, promote uniform interpretation of acquisition regulations, improve implementation of DoD procurement policy, and upgrade the quality of the CAS workforce while eliminating overhead and reducing payroll costs. The plan should make appropriate provision for continued technical and other support to program offices. It should also preserve the existing regulatory division of responsibilities between those of administrative contracting officers, to be exercised within the DCMA, and those of procuring contracting officers, which will continue to be exercised within the Military Departments.

***Communications With Users***

Both the Packard Commission and the Goldwater-Nichols Act sought to improve the requirements process, i.e., DoD's efforts to define military needs, their links to national strategy and deficiencies in existing capabilities, and the characteristics of specific systems to meet those needs. The Goldwater-Nichols Act staked out an important role for the CJCS, as spokesman for the CINCs, in this process. The Packard Commission emphasized the responsibility of the USD/A and the VCJCS to ensure that complex systems reflect a sensible calculus of cost, schedule and performance. Over the last several years, the VCJCS' Joint Requirements Oversight Council (JROC) and the USD/A's Defense Acquisition Board (DAB) have begun to collaborate more effectively for this purpose. This collaboration should be strongly encouraged, and the JROC should assume a broader role in support of DAB decisionmaking.

Accordingly, the Secretary and the CJCS will charter the JROC to review ***all*** deficiencies that may necessitate development of major systems, prior to any consideration in the DAB. Based on inputs from the CINCs, Services, and elsewhere, the JROC will review the validity of an identified mission need (as distinct from any potential system or program), assign a joint priority for meeting the need, and forward an approved mission need statement to the DAB.

Annually, the DAB will review mission needs identified by the JROC for possible Milestone 0 approval. Those candidates passing through this restructured Milestone 0 would not be considered programs in the traditional sense; instead, at this threshold the USD/A will authorize Concept Direction studies to evaluate potential alternative approaches to meeting validated, priority needs. The USD/A will coordinate the funding of Concept Direction Studies, resources for which may come from one or more of the Military Departments, a central fund controlled by the USD/A, or both. To address alternative approaches to meeting a variety of mission needs, more Concept Direction Studies may be undertaken than will be carried forward past Milestone I (Concept Approval). Particular care will be exercised at Milestone I to ensure that Concept Approval is given to no more new programs than long-term resources available to DoD will support. To provide for programs that do enter the post-Milestone I phase, a rough allocation of out-year resources for such purposes will be made at the DoD-wide level and, following Concept Approval by the DAB, allocated by the DPRB to specific new programs.

The JROC also will be chartered to play a continuing role in the validation of performance goals and baselines prior to DAB reviews of major programs (including, unless otherwise directed by the Secretary or Deputy Secretary, special-access programs) at all successive Milestone intervals.

***Better System Development***

Principal among the Packard Commission's concerns in recommending establishment of the USD/A was the perceived need for more vigorous policy direction in several related areas.

**Research and Development** -- Decisions made during the early phases of systems development -- including those that involve funds and schedules for prototyping and testing -- often have dramatic consequences for operational performance and life-cycle cost. The USD/A will be charged with developing and ensuring rigorous application of policies that support sound decisions on major programs through Full Scale Engineering Development. In particular, these policies will dictate that the schedules and management plans for major programs:

- support the building and testing of system and critical sub-system prototypes, the use of systems engineering, and the validation of manufacturing

processes as early as possible and certainly well prior to the commencement of High Rate Production;

- and provide for early test and evaluation of prototype hardware to prove concept, performance, and suitability in realistic operational environments.

The DAB review process will be restructured and disciplined to assist the USD/A in discharging these responsibilities. As prospective programs pass out of the Concept Direction (post-Milestone 0) phase, the USD/A will convene a DAB Milestone I (Concept Approval) review of requirements/costs tradeoffs, initial affordability assessments and other minimum accomplishments required by DoD directive. DAB Milestone II (Full Scale Engineering Development) and III (Production) reviews will ensure that other, progressively more exacting requirements are met. A redefined Milestone IV will replace the current Milestones IV and V. The new Milestone IV review will address the need for major upgrades or modifications to systems still in production.

In conjunction with the DoD Comptroller, the USD/A or his Principal Deputy will exercise so-called apportionment authority with respect to funding for programs passing through successive Milestone reviews, in order to ensure demonstrable attainment of minimum required accomplishments established in revised DoD directives, and the successful completion of all additional exit criteria levied on programs as a result of previous DAB reviews. Only the Secretary, Deputy Secretary and USD/A will have the authority to waive such requirements and exit criteria.

In general, the USD/A will be responsible for improving the timeliness, relevance and utility of the Selected Acquisition Reports (SARs), the Defense Acquisition Executive Summaries (DAES), and other information on acquisition matters available to senior DoD managers.

Constrained research and development (R&D) resources will pose special challenges to the maintenance of a strong defense technology base. The USD/A will be charged with coordinating R&D programs DoD-wide, to eliminate duplication of effort and ensure that available resources are used to maximum advantage. In this regard, the USD/A will have a broad mandate to strengthen technology development programs of the Military Departments and the Defense Advanced Research Projects Agency (DARPA); encourage technical competition and technology-driven prototyping that promise increased military capabilities; exploit the cost-reduction potential of innovative or commercially-developed technologies; and develop procurement policies conducive to this purpose.

**Procurement Policy** -- In regard to procurement policy, the Packard Commission emphasized specific reforms in two areas:

- substantially greater reliance on ***commercially-available products***, often well-suited to DoD's needs and obtainable at much less cost;
- and adoption of ***competitive practices*** predicated more broadly on a mix of cost, past performance and other considerations that determine overall "best value" to the government.

With respect to the former, the recent Report of the Defense Science Board's (DSB) Task Force on Commercial Components, which revisited the 1986 Summer Study conducted by the DSB in the aftermath of the Packard Commission, details a number of promising actions. These have emerged from the DSB's sustained review of existing impediments to procurement of commercially-available products, and underscore the potential for large economies through reform of DoD's buying habits. The USD/A will be charged with expediting the implementing administrative actions recommended by the DSB Task Force. The USD/A will also establish a data base to track progress DoD-wide in expanding procurement of commercially-available products.

The DSB Task Force's work demonstrates that realizing large cost savings through procurement of commercially-available products will also require simplified contracting procedures. Accordingly, the Administration should make two legislative proposals: first, the Commercial Products Acquisition Act of 1989, which would authorize procurement of such products under simplified competitive procedures that more closely emulate those of the commercial marketplace; and second, a Commercial Acquisition Pilot Program Act, which would establish a pilot program to demonstrate the advantages of adopting a full-range of commercial-style buying practices and streamlined dispute-resolution procedures. (See Appendix B.)

Improving DoD's competitive practices will require two related actions. First, existing laws governing acquisition should be clarified in order to provide DoD broader discretion in making contract awards competitively based not only on cost but on other considerations as well. The Administration should propose appropriate legislation clarifying the Competition in Contracting Act for this purpose. (See Appendix B.) Second, DoD will implement a contractor performance review system, building DoD-wide on recent efforts of the Air Force and DLA to expand source selection criteria to promote contracting relationships with DoD's best-performing suppliers.

## IV. GOVERNMENT-INDUSTRY RELATIONSHIP

Any effort to improve the relationship between government and defense industry must be rooted in this proposition: DoD will not tolerate illegal or unethical behavior on the part of ***anyone*** in the acquisition system. As a matter of fundamental policy, DoD, with the Department of Justice (DoJ), will devote its full energies and resources to enforcement of applicable laws.

All too obscured by the glare of recent investigations and prosecutions, however, is a corrollary proposition emphasized by the Packard Commission: bringing law-breakers to book for past deeds is not by itself enough; more affirmative efforts are necessary if DoD is to acquire, and industry to supply, equipment and materiel in a manner that meets the highest standards of accountability and performance. Among the specific approaches recommended by the Commission were the following:

- better administration of existing ethical standards for civilian and military acquisition personnel in DoD;
- greatly improved contractor self-governance, entailing the voluntary assumption by industry management of demanding new responsibilities for oversight of their contract operations;
- and more effective use of DoD auditing and other oversight resources.

The Defense Management Review took stock of progress in implementing these and other recommendations of the Packard Commission, as well as a variety of related initiatives to encourage improved industry performance and promote the health of the U.S. defense industrial base. Specific actions emerging from the Review are detailed below.

*Greater Accountability in Government*
The Packard Commission emphasized that:

> ***[i]t is critical in defense management to establish and maintain an environment where official standards of conduct are well understood, broadly observed, and vigorously enforced.***

Accordingly, it recommended that DoD mount a greater effort to administer ethics regulations, and develop guidance and training programs tailored to the acquisition workforce. More recently, the President, the President's Commission on Federal Ethics Law Reform, and Congress have spoken to the great need for training and educating government employees in their ethical responsibilities.

Particularly when considered against the range of these expectations, current DoD ethics programs appear notably deficient. For too long, such programs have been at best a secondary concern of DoD managers and relegated instead to lawyers and inspectors general. Consistent with the President's emphasis on

integrity in government, DoD will commit the energy and resources required for a model ethics program--particularly for acquisition personnel.

The Secretary will charter a DoD Ethics Council composed of the USD/A and the Secretaries of the Military Departments, and advised by the DoD Inspector General and General Counsel. An Executive Director for Ethics Training and Communications Policy will be appointed in the USD/A's office to support the Council's efforts. The Council will be specially charged with developing ethics programs for the acquisition workforce. It will concentrate on developing guidance tailored for acquisition personnel, and on improving existing compliance programs. It also will develop broader programs to enhance awareness and understanding of ethical issues--how they arise day-to-day, how existing standards may or may not apply, and what responsibilities DoD managers have as moral leaders. The programs will promote an on-going dialogue on ethics issues within DoD--from the Secretary and Deputy Secretary, who will personally participate, to the most basic working levels. The Council will review existing efforts in this area and recommend to the Deputy Secretary such additional personnel and other resources as may be required, including outside expertise necessary for designing the vigorous program intended.

In this regard, the Packard Commission noted that ethical standards are only as easy to observe, administer, and enforce as they are certain in scope, simple in concept, and clear in application. In the proposed Government-Wide Ethics Act of 1989, the Administration has recommended specific changes in law to ensure, among other things, that official standards are fair, objective, consistent with common sense, and not unreasonably restrictive so as to discourage able persons from entering public service. DoD strongly supports the proposed legislation, which will establish appropriate standards for, and preserve DoD's ability to attract and retain, personnel with the qualifications needed to manage the acquisition system.

***Greater Accountability in Industry***

Within the context of vigorous law enforcement, contractor self-governance remains the most promising additional mechanism to foster compliance with the high standards expected of DoD's suppliers. The conduct revealed by recent DoD-DoJ investigations, including Operation Ill Wind, is not representative. Major elements of defense industry ***have*** made strides in answering the Packard Commission's challenge. As with many other aspects of the Commission's recommendations, there is no occasion here for self-congratulations. Much remains to be done, and persistence will be required. Nonetheless, the Defense Industry Initiative on Business Ethics and Conduct and similar industry efforts deserve and will receive DoD's strong support. DoD will oversee the acquisition system in ways calculated to encourage responsible companies in such self-governance efforts, including establishment of corporate codes of conduct. If such codes are to be a meaningful reflection of management's priorities and

commitment, however, it is apparent that they must be adopted by contractors voluntarily, not mandated in procurement regulations. Like quality, ethics cannot be inspected into an organization. Accordingly, DoD will not adopt the rule recently proposed to mandate contractor codes of conduct.

DoD will continue its voluntary disclosure program, under which DoD contractors are encouraged to demonstrate their business integrity and honesty by disclosing evidence of possible procurement offenses. In order to reduce the possibility of inconsistent treatment of defense industry disclosures, the Secretary will work with the Attorney General to adopt and publish a standard agreement for program participation. In addition, to create clear incentives for corporate management, voluntary disclosure of potential violations will remain a central consideration in determination of a contractor's present responsibility to do business with DoD and hence in application of DoD's administrative sanctions (i.e., suspension or debarment).

DoD also will continue to encourage industry participation in its Contractor Risk Assessment Guide (CRAG) program. The CRAG program represents a joint DoD-industry response to several related recommendations of the Packard Commission, and promises more efficient use of DoD audit capabilities through greater reliance on effective contractor systems of internal controls. In conjunction with this program, the Defense Contract Audit Agency (DCAA) has projected broader DoD-industry communications on annual government audit plans in order to highlight opportunities for improved contractor internal controls. The DoD Comptroller, to whom DCAA reports, will be charged with providing strong policy direction and oversight to DCAA for purposes of increasing efficiency and eliminating duplication of effort through improved strategies for the conduct, scope and frequency of its contract auditing.

Over the long term, DoD will seek to develop a procurement system that rewards contractors for demonstrating their commitment to self-governance and all that that notion implies. A supplier's proven reputation for integrity is one aspect of past performance and, as in the commercial world, the totality of such performance merits consideration in the determination of "best value" to the government and in selection of those suppliers with which DoD does business. The USD/A will develop policies intended to guide source selection with these broader purposes in view.

***Better Performance by Industry***

There is, of course, more to creating a healthy relationship between government and industry than defining ethical responsibilities. There is also a need to promote robust industrial support for the U.S. defense program, and to prompt defense industry to greater competitiveness and to the simultaneous quality improvements and cost reductions achieved in other industrial sectors.

A series of major studies since the Packard Commission have documented an alarming erosion in the U.S. defense industrial base, including:

- a decline in the overall number of defense suppliers;
- accelerating import penetration and growing dependency on foreign sources for vital components and subassemblies;
- and decreasing returns on fixed assets, declining capital investments, and lagging productivity in key defense sectors.

Current trends are cause for concern, and if allowed to continue will jeopardize U.S. security. If these trends are to be reversed, the acquisition system must be managed in ways that promote improved supplier performance and a resurgent defense industrial base. Ultimately, only broad reform of the acquisition system, including the legal regime and oversight practices under which it currently operates, will attract more U.S. firms to do business with DoD. In the near term, DoD can encourage better performance by defense contractors by:

- using contract types that reduce unnecessary financial risks;
- controlling technical configuration;
- adhering to sound policies on profitability, independent research and development, and progress payments;
- and recognizing suppliers for consistently good performance.

DoD will take a series of actions along these lines, and seek to identify other promising means to encourage steady improvements in industry performance.

DoD will establish contractual relations that do not create financial disincentives to the degree of innovation and technical exploration clearly required by contractors in the early phases of major systems development in order to achieve proper operational performance and lower life-cycle cost. In addition to promoting the use of multi-year procurement contracts, the USD/A will strictly limit the use of cost-sharing contracts for systems development and the use of fixed-price type contracts for high risk development. USD/A approval will be required for any fixed-price type R&D contracts in excess of $25 million as well as those for lead ships.

The USD/A will also be charged with helping to promote the long-term, efficient producibility of systems. With the VCJCS, he will seek to expand the use of broad performance specifications in weapons design, and ensure that specifications are "locked in" prior to High Rate Production and upgrades or modifications are made on a block, not a piecemeal basis.

As a complement to DoD's own R&D efforts, R&D by defense suppliers helps encourage technological innovation, stimulate competition, and expand the availability of militarily valuable products. DoD will continue to recognize costs

incurred by suppliers for independent R&D, and bid and proposal, as necessary costs of doing business. Through the DPRB, it will maintain appropriate levels of funding to defray such costs and thereby promote development of promising technologies to meet future defense needs. DoD also will review periodically the level of progress payments on defense contracts, and maintain such payments at levels appropriate in light of prevailing interest rates and restraints on current DoD outlays. It also will use the tools at its disposal to motivate contractors to improve performance (through incentive-type contracts) and productivity (through profit guidelines that encourage capital investments). The USD/A will be charged with monitoring these and other policies that impact the long-term health and competitiveness of DoD's industrial base.

The USD/A also will develop a quality awards program that annually recognizes top performers in industry that meet cost, performance, and schedule baselines and exhibit high commitment to ethical management.

## V. CONGRESSIONAL ACTIONS

DoD, with other elements of the Executive branch, can realize significant improvements in defense management. This Review has sought to take full advantage of opportunities for administrative action, but also demonstrates that these opportunities are limited. The potential for improvement can be increased substantially if Congress adopts changes in legislation -- and can be increased dramatically if, and only if, Congress fundamentally changes the way it addresses defense programs and policies. The President called for DoD's views on steps of this sort to be taken by Congress to improve management practices and procurement procedures.

**Changes in Legislation.** The Review has identified a variety of specific actions by Congress that would assist in better management of the acquisition system. These are collected in Appendix B to this Report. In addition to those treated fully in earlier sections of the Report, one additional initiative deserves special emphasis. The Packard Commission observed that

> ***[o]ver the years, Congress and DoD have tried to dictate management improvements in the form of ever more detailed and extensive laws or regulations. As a result, the regime for defense acquisition is today impossibly cumbersome . . . .Congress [should] work with the Administration to recodify federal laws governing procurement in a single, consistent, and greatly simplified procurement statute.***

Similar concerns have been reflected in the work of other major study groups -- from the Blue Ribbon Defense Panel in 1970, to the Commission on Government Procurement in 1972, to the President's Private Sector Survey on Cost

Control in 1983, to the Office of Technology Assessment (OTA) in 1989. In its recent report on the defense technology base, OTA concluded:

> ***The defense acquisition system is a major contributor to the long delays in getting new technology into the field and erects formidable barriers to exploiting technology developed in the civilian sector. While Congress did not intend the system to be slow, cumbersome and inefficient, laws passed to foster goals other than efficient procurement have made it so.***

With the enactment of additional major legislation since 1986, when the Packard Commission finished its work, there is increased urgency to addressing the body of procurement law in its totality--in order to simplify and clarify the framework under which DoD and other departments operate, and more broadly to restore some breathing space for judgment and incentive necessary to make the acquisition process fundamentally more effective. This will require Congress to take the initiative, which the President should call for in urging the Congressional leadership to establish select committees in both Houses to commence work as soon as possible on a landmark recodification and streamlining of federal law in this area. For its part, the Administration should pledge unreserved support for such an effort, and work closely with the designated committees in order to help them complete their work at the earliest date.

**Broader Congressional Reforms.** Congress plays a central role in formulating and implementing U.S. defense policy. Much depends on the way in which it exerts its authority, and how well or poorly it carries out its responsibilities.

The intense scrutiny recently paid to DoD organization and management has occasioned a growing conviction that the procedures by which Congress today does its work require careful and thorough re-examination, as do the various ways in which Congress, its staff and Congressional agencies influence DoD operations. Critics, including many in Congress and the Executive branch, have focused on:

- the profound management problems and waste that inevitably result from the redundant phases of budgeting, authorizing and appropriating defense resources year by year;
- the policy gridlock implicit in the overlapping and duplicative jurisdiction over DoD affairs enjoyed by some 30 committees, 77 subcommittees, and 4 panels;
- the tremendous disparity of interests -- many difficult to reconcile with prudent management -- that DoD is given to serve through line items, general provisions in authorization and appropriations bills, and report language ; and

- the questionable benefit to Congress, and the unquestionable cost to DoD, of much Congressional activity. ***Every working day***, for example, entails on average almost 3 new General Accounting Office (GAO) audits of DoD; an estimated 450 written inquiries and over 2,500 telephone inquiries from Capitol Hill; and nearly 3 separate reports to Congress ***each*** averaging over 1,000 man-hours in preparation and approximately $50,000 in cost. In addition, senior DoD officials spend upwards of 40 hours preparing for the 6 appearances as witnesses and the 14 hours of testimony that they provide on average for ***each*** day Congress is in session.

If the ambitious purposes of the Goldwater-Nichols Act and the Packard Commission are ever to be fulfilled, Congress ***must*** devote serious attention to these issues. In a bipartisan spirit, with the objective of promoting essential collaboration between the Executive and Legislative branches, and more particularly of improving Congress' performance of its vital role in providing for the common defense, the President should urge the Congressional leadership to charter a study of legislative processes and identify specific changes (e.g., steps to institutionalize a biennial defense budgeting process) for consideration at the earliest date in the 101st Congress. To support this effort, and to build on recent work of the Packard Commission and others in this area, the Secretary will supervise preparation of a White Paper on DoD and the Congress, for submission to the President by October 1, 1989.

## VI. CONCLUSION

As was noted at the outset, realization of the President's full objectives for management of DoD will not be easy. It will require:

- teamwork among DoD's senior managers;
- sound, longer-range planning and better means for managing available resources;
- more discipline in what weapon systems we buy and how we buy them;
- better management of the people we rely on to produce such systems;
- an environment that promotes steady progress in cutting costs and increasing quality and productivity;
- and adherence to the highest ethical standards.

Even actions that can be implemented on existing authority within DoD will take time and devoted effort. Others, including those that demand Congress' and industry's attention, will require cultivating still broader consensus and commitment. Nonetheless, the American people expect that those who manage the nation's defense effort will aim high. And they deserve nothing less than the "quest for excellence" of which the Packard Commission spoke.

## APPENDIX A

## ACQUISITION WORKFORCE

Most narrowly defined, the acquisition workforce comprises only those who negotiate and administer contracts for major weapon systems. Broader definitions include activities occurring outside the contract process, such as documenting the need for a new weapon, testing systems under development, maintaining systems in the field, and disposing of outmoded or unneeded equipment. Service organizational structures generally group these functions together . A still more comprehensive perspective would encompass all those who procure the ordinary goods, such as office supplies and delivery vehicles, needed to support any large organization within DoD.

Three general methods are available for estimating the size of this workforce:

- Surveying actual job activities;
- Counting people in specified occupations; and
- Counting entire organizations.

Experience has proven the first to be impractical; the second and third, used separately, inevitably miss some employees with significant procurement duties. A combination of occupational and organizational counts, while perhaps marginally overstating the total workforce, is necessary to take into account all personnel involved in these procurement duties.

Applying this method against a "cradle to grave" concept of acquisition is consistent with the charter of the USD/A, which assigns authority for the "system whereby all equipment, facilities, and services are planned, designed, developed, acquired, maintained, and disposed of within the Department of Defense." This method encompasses 11 Service commands and one Defense Agency, as well as those who work outside these organizations in 9 civilian occupations and 38 military officer specialties. It adds four commands to a list developed by the General Accounting Office in an earlier study of defense acquisition. This method also adopts the same job categories used by the Packard Commission in estimating the size of the acquisition workforce. The table following represents the most recent personnel totals available.

## ACQUISITION WORKFORCE

| ACQUISITION ORGANIZATIONS | Employment* Civilian | Military |
|---|---|---|
| 1. Army Information Systems Command | 18,817 | 1,701 |
| 2. Army Materiel Command** | 105,592 | 2,773 |
| 3. Office of Naval Research | 5,029 | 114 |
| 4. Naval Facilities Engineering Command | 19,650 | 730 |
| 5. Naval Air Systems Command** | 43,903 | 1,128 |
| 6. Naval Supply Systems Command** | 26,278 | 640 |
| 7. Naval Sea Systems Command** | 110,181 | 1,424 |
| 8. Naval Space and Warfare Systems Command** | 28,572 | 630 |
| 9. Air Force Logistics Command** | 86,676 | 3,109 |
| 10. Air Force Systems Command** | 28,366 | 10,407 |
| 11. Air Force Communications Command | 6,921 | 4,088 |
| 12. Defense Logistics Agency** | 53,134 | 795*** |
| OTHER ORGANIZATIONS | | |
| Acquisitions Occupations**** | 18,645 | -- |
| Acquisitions Specialties**** | -- | 2,828*** |
| TOTAL | 551,764 | 30,367 |
| GRAND TOTAL | 582,131 | |

* As of December 31, 1988. This does not include subsequent programmed reductions.
** Listed by General Accounting Office as "buying commands."
*** Estimated.
**** As identified by Packard Commission.

## APPENDIX B

## SPECIFIC LEGISLATIVE INITIATIVES

1. **Stability In Funding Programs: Eliminate the current requirement that a proposed multiyear contract achieve a specific percentage savings before the contract may be entered into.**

   The FY 1989 Defense Authorization Act (Pub. L. 100-456, 102 Stat. 1928 (Sept. 29, 1988)) currently limits the number of programs that can qualify for multiyear procurement savings because they fail to meet the minimum savings threshold. This threshold should be eliminated or, at a minimum, reduced. This can be done at no expense to Congressional oversight of the procurement process because DoD would still have to justify a multiyear procurement in terms of cost savings and other benefits before Congress authorizes and funds the program. In addition, a multiyear procurement would have to satisfy the statutory criteria concerning benefit to the government, stability of requirements, stability of funding, stability of configuration, confidence in cost estimates, and confidence in the contractor's ability to perform. 10 U.S.C. Sec. 2306(h). The proposed amendment would simply permit DoD and Congress to evaluate each multiyear procurement candidate program on its own merits.

2. **Alternative Personnel System: Authorize the Secretary of Defense to establish a personnel and pay system for civilian acquisition employees.**

   The proposed legislation--modelled after the China Lake project--would authorize the Secretary to design employment, compensation, performance, management, training, and benefits programs to enhance the Department's competitive position in the labor market for acquisition personnel. Designed in conjunction with the Office of Management and Budget and the Office of Personnel Management, the personnel system (including senior acquisition personnel, contracting officers, scientists and engineers) would be phased in over a number of years and introduced in discrete stages at the different organizations and for different occupations involved in the acquisition process. The approach would include consideration of, among other things, using the concept of pay banding; paying differentials to supervisors and managers; paying performance/retention bonuses; establishing a system of direct examination and hiring; and designating a certain number of positions in specific research and development laboratories or technology centers requiring extraordinary qualifications. The cost of the alternative personnel system would be limited to the costs that would have been incurred had the system not been implemented.

3. **Pay-for-Degree Legislations: Amend current law (5 U.S.C. 4107(c)) to permit expanded opportunities for the education and training of civilian acquisition personnel.**

Under current law, DoD is barred from paying for training the sole purpose of which is to permit an employee to obtain an academic degree. 5 U.S.C. Sec. 4107(c). The current bar to degree training can be a disadvantage to the DoD in competing in the marketplace for employees with skills critical to its acquisition functions.

On March 20, 1989, the Administration submitted a legislative proposal "To amend title 5, United States Code, to allow degree training for Federal employees in critical skills occupations, and for other purposes." See Letter from Constance Horner (Director, Office of Personnel Management) to the Hon. James C. Wright, Jr. (Mar. 20, 1989). This authority would be an important factor in improving the quality of the DoD's acquisition workforce and should be enacted expeditiously.

4. **Greater Use of Commercially-Available Products.**

a. Authorize Simplified Competitive Procedures--

The Administration should submit the proposed "Commercial Products Acquisition Act of 1989." This proposed legislation would authorize the use of commercial-style, competitive procedures for the acquisition of commercial products. The proposed legislation would provide acquisition officials with the flexibility they need to emulate their commercial counterparts and capitalize on the efficiencies possible when buying products off existing production lines. The proposal is designed to provide acquisition officials with an efficient means for conducting market research and identifying the products constituting the best values. In addition to shortening acquisition leadtimes and increasing competition, the proposal will enhance DoD's ability to acquire high-value commercial products incorporating the most up-to-date technology. The proposal would also exempt commercial product acquisitions from the unique requirements that ordinarily apply and impose source preferences, special contract provisions, and performance requirements when the Government is the purchaser.

b. Establish a Pilot Program to Evaluate DoD's Use of the Full-Range of Commercial-Style Practices--

The Administration should also submit a "Commercial Acquisition Pilot Program Act." In addition to the improvements provided by the proposed "Commercial Products Acquisition Act of 1989," this Pilot Program would require certain DoD components to use the full range of commercial contracting terms and conditions when buying commercial products; exempt the acquisition of commercial products from the numerous statutory requirements



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that otherwise govern government contracts; and dramatically streamline dispute resolution procedures. The Pilot Program would last for two years and would be periodically reviewed by DoD and Congress to evaluate its impact.

5. **Best Buy Practices: Clarify the Competition In Contracting Act (10 U.S.C. Sec. 2305(b)(4)(A) (ii)) to permit a contract to be awarded without discussions, on a basis other than price alone, when the award would be in the best interests of the Government.**

The Comptroller General has held that, under the current statute (10 U.S.C. 2305(b)(4)(A)(ii)), when a decision is made by a contracting officer to award a contract without holding discussions with competing contractors, price must be the sole basis for making the award. See Mariah Assoc., Inc. B-231710 (Unpub. Oct. 17, 1988); United Telecontrol Electronics, Inc. B-230246 (Unpub. June 21, 1988); and Meridian Corp., B-228468 (67 Comp. Gen. 233, Feb. 3, 1988). This requirement--that the lowest bid be accepted even where it does not result in the "best value" to the Government--eliminates the benefits that accrue from making awards without discussions where a contractor's design or technical proposal is clearly superior and the price is fair and reasonable. It also limits the Government's ability to select commercial products on the basis of best value to the Government, by lengthening the acquisition time involved and increasing the overall cost of the procurement. The proposed amendment would eliminate these problems, and ensure that DoD has the benefit of more vigorous competition.

THE SECRETARY OF DEFENSE

WASHINGTON, THE DISTRICT OF COLUMBIA

January 11, 1990

Dear Member:

In his February 1989 address to a Joint Session of Congress, the President directed a review of Defense Management and the development of a plan that would implement fully the Packard Commission recommendations; improve substantially the performance of the defense acquisition system; and permit more effective management of the Department of Defense and our Defense resources.

In July, I submitted my Defense Management Report (DMR) to the President to achieve the goals he had set forth. Upon his approval, I directed that detailed implementation plans be developed. Those plans have been submitted and have now been approved.

I am forwarding for your information a package which provides a status report on the broad ongoing effort to improve defense management inside the Department.

We have established a continuing effort towards improving the way we do business in the Department of Defense. I look forward to your support and assistance in these times of challenge and opportunity.

If your staff would be interested in further details, please contact my legislative affairs office at 697-2365 for details.

Best regards,

Enclosure:
As Stated

## DEFENSE MANAGEMENT REPORT IMPLEMENTATION PROGRESS REPORT

President Bush, in his February 1989 address to a Joint Session of Congress, charged the Secretary of Defense with undertaking a review of defense management practices. In response, Secretary Cheney sent the Defense Management Report (DMR) to the President in July 1989. The DMR provided a plan to implement fully the Packard Commission recommendations; improve substantially the performance of the defense acquisition system; and manage more effectively the Department of Defense and the defense resources.

The DMR called for the Deputy Secretary of Defense, the Secretaries of the Military Departments, the Chairman of the Joint Chiefs of Staff, the Under Secretary of Defense for Acquisition (USD(A)), and the Under Secretary of Defense for Policy (USD(P)), as the senior managers within the Department of Defense, to undertake a broad range of actions to carry out the President's charge.

The implementation process established for the DMR provides for continuous improvement of defense management. Accomplishing the full set of objectives will require several years of significant effort. This progress report highlights the first generation of DMR implementation actions. These efforts are designed to achieve six broad goals:

1. Reduce overhead costs while maintaining military strength;
2. Enhance weapon systems program performance;
3. Reinvigorate the planning and budgeting process;
4. Reduce micromanagement;
5. Strengthen the defense industrial base; and
6. Improve observance of ethical standards in government and industry.

### Reduce overhead costs while maintaining military strength

The Department is implementing a significantly more streamlined acquisition management structure with clear lines of responsibility and authority running from the USD(A) through full-time Service Acquisition Executives (SAEs) and full-time Program Executive Officers (PEOs) to individual Program Managers (PMs). Each Military Department has developed a plan for and is now streamlining its acquisition management structure in a manner consistent with the DMR.

The Services' systems and materiel commands will be reorganized with a primary focus on three roles: to provide service logistics support, to manage programs that fall outside the PEO structure, and to provide a variety of support services to the PEOs and PMs. The revised structures will eliminate layers of

supervision and functions that add little or no value to the overall management of DoD and should improve the efficiency of the acquisition and logistics systems.

Nearly all contract administration services (CAS), currently divided among the three Military Departments and the Defense Logistics Agency (DLA), will be consolidated under DLA. This action will result in a streamlined CAS organization that will promote uniform implementation of acquisition policies and regulations and will result in savings of both dollars and manpower. Consolidation under DLA was chosen over creation of a new Defense agency in order to avoid the significant overhead costs associated with establishing a new management structure. The remaining CAS operations will also be reviewed for possible consolidation and additional streamlining opportunities.

A Corporate Information Management initiative is underway to develop more efficient and effective data processing and information systems, eliminate duplication of effort in information management, and ensure that the systems support policy goals and timely decision-making. This initiative will benefit from the advice of experienced and creative information management specialists in both industry and the DoD.

Through these and other similar efficiency efforts, DoD will realize a total reduction of approximately 18,000 civilian and 24,000 military personnel in acquisition and management positions by the end of 1995. DoD will make a concerted effort to manage the reductions and consolidations through attrition and relocation. These numbers represent a true streamlining, because personnel requirements at all levels will be reduced as efficiencies are achieved.

Personnel reductions, organizational streamlining, and improved efficiencies resulting from better management control systems, will bring about reductions in the cost of managing the Department of Defense. The current estimate is that DoD will save approximately $2.3 billion in FY 1991 and $39 billion over the period from FY 1991 through FY 1995 from the five-year Defense budget as amended in April 1989. The savings represent a significant down payment toward the revised administration spending targets. In addition to the savings described above, one adjustment alone in how the Department finances and manages reparable parts will enable DoD to make more efficient use of $2.8 billion of budget authority in FY 1991.

Streamlining efforts are the result of a continuing, thorough approach to eliminate unnecessary layers of personnel and non value-added functions. Study groups are currently investigating possibilities for consolidation or further streamlining of: supply depots; maintenance depots; inventory control points; accounting operations; research and development laboratories and test facilities; and automated data processing design centers and operations. These groups will report their findings and recommendations to the Deputy Secretary of Defense by May 1, 1990. In addition, the Department will continue to extend efforts to increase efficiency in other sectors of DoD management.

Finally, programmatic force structure reductions are under consideration for future years. If changes in the world situation and the results of international negotiations permit those programmatic reductions to occur, DoD may be able to realize further reductions in management support structures and associated costs.

Enhance weapons systems program performance

The USD(A) has the charter to discipline programs through a revised and strengthened 4-phase acquisition process. Programs must successfully achieve defined milestones and specific exit criteria set by the USD(A), with the advice of the Defense Acquisition Board (DAB). Clear policies guiding this revised process have been issued.

In addition, the Joint Requirements Oversight Council (JROC), chaired by the Vice Chairman of the Joint Chiefs of Staff, has assumed a broader role in the articulation of military requirements and the validation of performance goals and baselines for all DAB programs. Working through the DAB and JROC, the USD(A) will ensure that complex systems reflect a proper combination of cost, schedule and performance parameters.

The military departments have developed plans to create dedicated corps of officers who will make acquisition a full-time career. They will be provided specialized education and training, attractive and equitable career paths, and opportunities for promotion to the highest ranks. Among actions to improve the civilian workforce will be efforts to enhance recruitment and retention, provide career-related education and professional rewards, and increase professionalism within the acquisition-related fields.

The streamlining of the acquisition management structure is designed to improve the flow of information between program managers (PMs) and the Department's senior decision-makers. To help keep the management lines clear, and to assist the PMs, a task force was formed to evaluate the effect of single-interest program advocates within DoD. These advocates are functional experts (transportation, packaging, metrification,etc.) who can pose restrictions but who possess no integrating authority or responsibility for the program process and tend to make the acquisition system less efficient. This task force and the Regulatory Relief Task Force (described below) independently examined 148 DoD-level directives and instructions which tend to diminish the PM's ability to exercise authority. The Advocacy Reduction Task Force Interim Report recommends that 104 of these advocacy-related issuances be canceled outright or canceled and combined with other issuances. When taken together with the regulatory reduction, these internal changes will reduce significantly the self-imposed constraints on sound program management.

Although much has been accomplished in this area, there is considerably more which needs to be done. The USD(A) will continue to develop a unified and significantly streamlined set of acquisition policy guidance. The goal is a simplified acquisition system, run by well trained, dedicated professionals who are able to perform their function with a minimum of bureaucratic distraction. Authority and responsibility will be pushed down through the program management chain to the program managers who will, in turn, be held increasingly accountable for the product of their efforts.

Reinvigorate the planning and budgeting process

The Secretary chairs a new Executive Committee consisting of the Deputy Secretary, Secretaries of the Military Departments, Chairman of the Joint Chiefs of Staff, and the two Under Secretaries of Defense. The Executive Committee reviews overall Department policies and permits regular and confidential exchanges on key issues among the Department's senior leadership.

In addition, the Deputy Secretary manages a revitalized planning, programming and budgeting system as Chairman of the Defense Planning and Resources Board (DPRB). Through DPRB discussions the senior leadership in DoD has engaged in a dynamic planning process that will, over time, improve the Department's ability to link policy, strategy, programs, and budgets through such

tools as a restructured Defense Planning Guidance (DPG). The USD(P) serves as the primary advisor to the Deputy Secretary for the planning phase and the preparation of the DPG. A new DPG is being prepared which reflects the dynamic world events of recent months. This process forms the basis of an ongoing review of defense issues which will serve as groundwork for the establishment of the defense program for the next six-year period.

In addition, the USD(P) has been given an larger role in the DPRB to ensure that policy and strategy considerations are integrated throughout the programming and budgeting phases. This process has already proven successful in developing plans to expand DoD's role in countering the production and trafficking of illegal narcotics, in supporting the reformulation of overall defense strategy in a rapidly changing world environment, and in the establishment of a significantly reduced FY 1991 Defense budget.

The DPRB discussions will play a vital role in providing better links among national policies, military strategy, and defense programs. To support this effort, the USD(A) will play an increased role in the resource allocation process to establish tight links between program and resource planning.

Reduce micromanagement

The DMR charged the USD(A) with assembling a joint task force to evaluate the effect of internal regulations on the acquisition process. A Regulatory Relief Task Force of nine working groups has achieved impressive results from its exhaustive effort. The task force reviewed a bewildering maze of self-imposed regulations.

For example, of the more than 1,200 DoD directives and policy memoranda reviewed, 512 were determined to affect the acquisition system. The Regulatory Relief Task Force has reviewed 383 of these documents and has recommended elimination of 61; cancellation or combination of 176; revision of 63; and retention, as is of only 83. In the procurement and contracting area, the task force has recommended the cancellation, combination, or revision of 64% of the 431 Defense Federal Acquisition Regulation Supplement (DFARS) contract clauses, 79% of the lines in the 66,665 lines of DFARS text, 76% of the 80 Military Department and DoD Agency contract clauses, and over 52% of the 44,057 lines of Military Department and Defense Agency text.

Finally, questionnaires have been distributed on over 50,000 specifications and standards and related documents for review. The task force has focused its initial review on about 1,500 high payoff standards with the most promising potential for increased efficiency.

In an effort to reduce internal micromanagement, the Department will overhaul completely the system of acquisition directives and instructions. A new streamlined set of documents is expected to be issued by July 1990 in a form that permits implementation at the program manager and field operating level, with minimal additional policy guidance. In addition, guidance relating to procurement and contracting will be completely restructured and streamlined by February 1991 with the publication of a new Defense Federal Acquisition Regulation Supplement. The task force will submit final recommendations on key Defense acquisition standards by April 1990 with recommendations due on the remaining body of specifications and standards by December 1990. To institutionalize the philosophy of reduced micromanagement, the USD(A) will develop recommendations to improve the process by which DoD-level documents are developed and issued.

A legislative task force was chartered under the direction of the Legislative Counsel and former Secretary of the Army, Jack Marsh, to review existing statutes and to recommend changes that would improve DoD efficiency. The task force's report recommends legislation to improve the management of:

- production, acquisition, and logistics;
- military and civilian personnel;
- environment; and
- departmental finances.

DoD will be working with the Office of Management and Budget and the Office of Personnel Management, among other agencies, to develop the Administration's legislative package.

The report also calls on Congress to work with the Administration to review and overhaul the statutory framework for DoD acquisition. To aid in this effort, the report suggests specific themes that should guide such an effort.

As called for in the DMR, a White Paper on DoD and Congress is being sent to the President which emphasizes the need for cooperation between the executive and legislative branches on defense issues.

Strengthen the defense industrial base

The contractors that comprise the defense industry will play a vital role in our future defense efforts. The industrial base must be strong, and include manufacturers that are highly flexible, technologically advanced, and ever-creative if DoD is to fulfill its mission of defending the Nation in the years ahead. This will require that both DoD and industry maintain active research programs in vital technologies that will be particularly critical in the future.

In order to strengthen this industrial base, DoD must create incentives (and eliminate disincentives) to invest in new facilities and equipment as well as in research and development. One tool of particular importance in this regard will be continued DoD support of independent research and development efforts in industry.

The quality of end products and the productivity of defense manufacturers can be improved through the use of contract mechanisms that reduce unnecessary financial risk. For example, the Department will restrict severely the use of fixed-price development contracts. Such contracts, which are restricted for programs over $10 million, tend to put contractors in the untenable position of developing high-risk programs at a fixed price. This tends to inhibit exploration and innovation early in a program when changes in design can be made more effectively at a much lower cost. Likewise, cost-sharing arrangements would be given similar scrutiny and subject to limitations.

In addition, DoD is fostering better performance by defense contractors through the proper control of technical configuration and by developing sound policies on profitability and progress payments. Finally, the Department is developing a contractor performance review system that will permit a more thorough consideration of past performance in source selection and thereby promote contracting relationships with suppliers with solid histories of performance.

**Improve observance of ethical standards in government and industry**

The Secretary chartered a DoD Ethics Council consisting of the USD(A) and the Secretaries of the Military Departments to develop ethics programs for the Department. The Council has met and established a joint working group headed by the Director, Ethics Training and Communications Policy to:

1. Develop a proposed model ethics program for DoD (including education and training).

2. Develop a plan for a DoD-wide Ethics Conference.

3. Review existing compliance programs for needed enhancements.

The results of these efforts are to be provided to the Council for review in January 1990.

The Department is considering a proposal to revise fundamentally the process of industry compliance and government oversight in procurement matters. The proposal calls for a demonstration program in which several Defense contractors enter into specific compacts with the relevant federal government agencies. Each compact would be based upon complementary commitments from both the firm and government in the areas of: (a) compliance and enforcement; and (b) oversight auditing of a contractor's financial and systems performance. DoD will begin developing this proposal with other interested government agencies in the near future.

The goal of these efforts is to strengthen the observance of ethical standards within government and with industry and to create an environment where official standards of conduct are well understood, broadly observed, and vigorously enforced.

**Improving Defense Management**

The strength of the DMR process and its relative advantage over earlier efforts to change management techniques and structures within the Department is that the DMR is a product of the Department itself, not something forced on it from outside. The people - both civilian and military - who developed the changes described above will be the same people called upon to make those changes work. The changes are not quick fixes but rather fundamental shifts, "cultural changes," that address the

issues at the core of defense management. While it may take time to realize fully the extent of the changes associated with DMR, we are proud of the accomplishments to date. This is the first DMR Implementation Progress Report.

The Department's leadership is committed to improving defense management by:

- reducing overhead while maintaining military strength;
- enhancing weapon systems program performance;
- reinvigorating the planning and budgeting process;
- reducing micromanagement;
- strengthening the defense industrial base; and
- improving observance of ethical standards in government and industry.

January 10, 1990

**DEFENSE MANAGEMENT REPORT INITIATIVES**
**SUMMARY OF ACTIONS TAKEN AND BUDGET IMPACT**

**DEFENSE MANAGEMENT REPORT: INITIAL ACTIONS TO ACHIEVE ITS OBJECTIVES**

The Department of Defense is engaged in a sustained, long-term effort to streamline its management, with a special emphasis on Defense acquisition management. The first major installment of this effort is reflected in the actions taken to reduce management costs in the FY 1991 budget. These budget actions are in response to the President's call for DoD management improvements in his February 1989 address to Congress. Following the President's request for management improvement, the Department completed the Defense Management Report (DMR) in July 1989. It sets substantial dollar savings targets for management improvement beginning in FY 1991 and continuing at least through FY 1995.

Using the DMR as its guide, the Department has identified initiatives to save about $2.3 billion in FY 1991. Over a five year period, FY 1991-1995, the cumulative savings will be close to $39 billion, with corresponding reductions of 18,000 civilians, and 24,000 military. These savings through better management have made an important contribution towards reaching the President's budgetary goals, and will enable the Department to maintain greater military capabilities than would have been otherwise possible.

**APPROACH TO MANAGEMENT IMPROVEMENTS**

The Department's approach to the DMR has been a cooperative effort with the full participation of the Military Departments.

Improvements in technology have made many of the proposed changes possible.

DoD's approach to achieving DMR efficiencies emphasized the following:

- Develop management efficiencies that do not require force level or strategy changes.
- Maintain the level and improve the quality of management support, while reducing the costs.
- Use technology, including ADP systems and communications, to reduce costs.

- Increase the accountability of program managers by increasing the visibility of total program costs and by placing the costs of doing business under the control of people executing the programs.

- Use budget savings realized through management efficiencies to meet DoD's budget target.

- If, for other reasons, force level reductions are necessary, consider further reductions in the DoD management support structure and associated cost reductions.

- If reductions in personnel are necessary due to streamlining and consolidations, the first objective will be to achieve these reductions through attrition and early retirements. Displaced employees will be assisted in finding appropriate positions in the Department.

With these guidelines in mind, DoD has identified areas where management efficiencies will produce savings. Acquisition and logistics management were the primary focus of this effort because:

- The President charged DoD to fully implement the Packard Commission proposals; and those recommendations mainly addressed problems in acquisition and logistics.

- Acquisition and logistics management account for about one-third of the DoD budget.

- Management deficiencies identified by OMB, by the Inspector General, and in the DoD Annual Statement of Assurance suggest there is a high potential for management efficiency and cost reduction in these areas.

In addition, emphasis was given to other functional areas including:

- Administration

- Automated Support and Information Systems

- Finance, Procurement and Contract Management

- Consolidation Studies

In each of these functional areas, budget savings were sought through the use of management efficiency concepts including:

- Consolidating operations in support areas.

- Streamlining operations by eliminating unnecessary layering and redundant functions.

- Improving business operations through better systems and procedures.

- Reducing headquarters operations where such reductions can occur without impairment to management control.

A description of the Defense-wide issues and the results expected from actions in each of the functional areas follows. Service specific initiatives are described in the Service DMR Reports.

LOGISTICS

The Department spends approximately $30 billion a year managing the supply system, including the cost of supplies. The value of inventory on hand is approximately $100 billion and has been increasing annually. The logistics initiatives address the need for improvement of the supply system and reduced supply costs. Specific changes have been identified for supply management, distribution, transportation, and management of clothing and textiles.

It has become evident that the current policies and procedures have served to impede improved operations and may have increased the cost of doing business by not allowing the flexibility to make smart management decisions. In addition to the impediments institutionalized through policy, there is the problem that "stove-pipe thinking" has also become institutionalized. One of the major changes needed is a change in mind-sets. Supply managers must see and understand -- must have visibility -- of the costs of their operations and the willingness to make trade-off decisions to do what is in the best interest of the Department. A global perspective is required as DoD moves into the future.

- Materiel Management Costs in Stock Fund

  Funding of operational costs of materiel management and distribution will be moved to the Stock Funds and these costs will be reflected in the cost of materiel through the surcharges the Military Departments pay for materiel. This allows greater visibility of the actual cost of operation. It also allows managers greater flexibility in making decisions that may ultimately result in cost reductions by taking down some of the barriers between appropriations. It is envisioned that in at least some areas manpower requirements may be increased, but with an overall decrease in the cost of the materiel. For example, a supply center may find intensified value engineering, or materiel break-out efforts, could break sole source contracts and result in

decreased cost of materiel through increased competition. In a Supply Depot, more workyears in transportation may increase shipment consolidation, thus resulting in reduced costs.

The major cost factor is inventory, and a key to improved inventory management is increased visibility of assets. If the item manager can look into the retail, wholesale, and operating stocks, decisions to redistribute can be made rather than a decision for a new procurement. This reduces lead time, costs, and inventory levels. Systems changes are necessary to accomplish this change and are being programmed as DoD works toward a single logistics system.

- Improved Management of Repairables

This initiative transfers Army and Air Force funding of repairable parts from direct appropriations to the stock funds. This in turn will require users to pay for new repair items which in the past have been free issue and will give users an incentive to repair rather than purchase new items. The estimated savings are the result of reduced consumption due to users having the option to choose between repair or replacement. The Navy transferred the funding of these items to the stock fund in the early and middle eighties and realized a reduction in demand for repairable items. The savings for Army and Air Force reflect an expected decrease in demand. There is an additional benefit by providing the opportunity to reprogram between the various categories of cost because of having a single funding source for procurement and maintenance of repairables.

- Multi-Year Contracting

Policies are being changed to assist in changing the way DoD buys and manages. One of these provides obligational authority to permit multiple year contracts with guaranteed minimums. The idea behind this change is to move us toward just-in-time materiel management while building long-term relationships with contractors but not binding us from moving items to more favorable contracts as practical. Multiple year contracts can drastically reduce lead times that are very costly.

- Storage Location Policies

  Another policy affecting returns is the decision to retain returns at the closest depot to reduce handling and transportation costs. Ownership of the item will remain with the wholesale item manager and when an item is requisitioned, they will notify the holding depot to release the materiel. Another initiative that affects stocking policy is to allow the storage of materiel close to the vendor rather than the customer. In these times of overnight delivery, transportation can be efficiently managed and this initiative is expected to result in savings.

- Reducing Transportation Costs

  The Department spends $2 billion per year on transportation costs. Some of the innovations that have taken place in the private sector will be incorporated into DoD operations. This includes the establishment of regional freight consolidation centers that will operate much like the Federal Express hubs; modifying the priority system to ensure that only those items that are urgently required are shipped separately; shipping material directly from vendors to users and utilizing a "guaranteed traffic" program that includes competitive awards to carriers to provide scheduled movements on specific routes in return for reduced rates.

- Clothing and Textiles

  Clothing purchases for each of the next three years will be limited in order to reduce inventory growth. The purpose is to alter an unacceptable drain on DoD resources. That is, over the last few years, receipts from purchases have exceeded sales by approximately $500 million. Reducing sales by $80 million for each of the next three years will reverse the growth and be reflected in surcharge reductions in FY's 1992-1995.

  The policy for introducing new clothing items will be changed to require the Services to pay for purchases up front, thereby making customers more aware of the cost of adding new items to the inventory. Also, the Services will be encouraged to use commercial specifications, increase standardization, and reduce the number of clothing sizes. Finally, specification development for clothing items will be consolidated and centralized.

While a number of initiatives have been described for the logistics area, the main theme is improved efficiency and effectiveness. As expressed earlier, success is dependent on the degree which managers are willing to change. Increased visibility and understanding of all facets of logistics allow for better management decisions. Enhanced ability should provide positive reinforcement to all employees involved in this important business. Nothing is being tried that hasn't proven itself as a motivator for improvement.

**ADMINISTRATION**

The Packard Commission and the DMR both called for streamlining of headquarters operations and other efficiencies that lead to reductions in staff augmentation. A series of actions address those objectives.

- Streamlining the Defense Agencies and OSD Offices

  The Defense Agencies were asked by the Under Secretary of Defense (Acquisition) to seek management improvements and efficiencies. Defense Agencies will realize reductions through organizational changes, headquarters reductions, automation improvements and procurement efficiencies.

  Although the budget anticipates these savings will be made through personnel reductions, the Agencies were given the flexibility to implement alternative program reductions, if appropriate, which do not require corresponding end strength decreases.

  The DMR recommended streamlining the Office of the Secretary of Defense, and the budget will reflect personnel reductions. This decrease will be offset by transferring some billets into OSD which the Inspector General believes should be shown on OSD rolls rather than in Defense Agency totals.

- Reducing Costs of Civilian Personnel Services

  The Department has operated with a lower ratio of personnel staff to population served than most Federal Agencies. The decision reflected in the budget is that all Services should operate with the same ratio of personnel staffing to population being serviced. The Navy ratio is 1:61 and is the recommended mix. The Navy has adopted the "Manage to Payroll" philosophy which reduces centrally managed regulations and gives line managers more flexibility in their personnel management. By adopting a similar personnel management philosophy, the other Services can achieve similar savings.

- Industrial Funding Military Personnel Cost

  Military personnel costs have not previously been reflected in the cost to run industrial facilities, shipyards, ammunition plants, etc. In FY 1991, we will reflect military personnel costs to ensure visibility of these personnel expenses to managers.

- Civilianization of Military Spaces In Support Functions

  DoD will substitute civilian manpower for military manpower in positions which do not specifically require a military incumbent. On the average, a civilian work force is less costly than a military work force, and overhead support-type functions can be performed by civilians as opposed to military. These functions include installations management, management headquarters for support commands, research and development, training and personnel, joint activities, and support activities. The savings result from the conversion of about 20,000 positions over the five year period.

**IMPROVING AUTOMATED MANAGEMENT INFORMATION SYSTEMS AND IMPLEMENTING CORPORATE INFORMATION MANAGEMENT**

The Department of Defense has made a strong commitment to the improvement of the way it collects, uses and manages information that supports its business operations. The Department presently spends $9 billion annually on automated information systems that are essential to the management of the Department. DoD is committed to improving the standardization, quality and consistency of data from its multiple management information systems. Further, it is committed to adoption of single systems in each of the major functional areas of management.

Deputy Secretary Atwood developed a plan in response to the DMR mandate to improve support systems and to achieve needed improvements through implementation of a Corporate Information Management Program for DoD. This will involve calling on an executive level group of outside experts to help DoD develop the appropriate procedures and mechanisms for systems that are standardized and integrated and provide top management with useful, timely information on the business operations of the Department.

- Single DoD Business Information Systems

  DoD spends approximately $9 billion per year on information systems, of which approximately $4 billion is devoted to the development of new systems. A significant portion of the $4 billion is spent on developing Service-unique systems to meet essentially the same requirement. The Department has traditionally

had multiple management information systems performing the same or very similar functions in each Service and other organizational elements. Examples of these duplicate system developments are: payroll, warehousing, accounting, and supply management. Under this initiative, the development effort will gradually transition towards DoD-wide uniform systems. Teams of experts from the Military Services and OSD are being assembled in each of the functional areas to accomplish this objective.

- Computer Aided Logistics Support

  Computer aided logistics support (CALS) will allow the Department to accept digitized logistics technical information from weapon system contractors, using OSD-accepted standards, in digitized electronic format rather than hard copy. CALS will support the technical information needs of the Department and develop a network system architecture for interoperability of existing/emerging stand-alone technical information data bases currently used in DoD. The Navy has proposed ten separate initiatives of CALS that have the potential for improving the development, maintenance, and dissemination of logistics and design data, and have the potential for wider utilization in DoD. Acceleration of ongoing programs will achieve significant savings compared to currently funding levels.

**FINANCE, PROCUREMENT AND CONTRACT MANAGEMENT**

Both the financial and contract communities have recognized that further cost efficiencies and operational improvements can be achieved through the consolidation of like activities, the establishment and maintenance of control over valuable resources and property, and enhanced measurement and accountability for assets owned or contracted for by the Department. Economic benefits will be derived by more closely scrutinizing specific managerial oversight responsibilities related to financial monitoring, the consolidation of DoD contract management, and the use of consultants by DoD.

- Improved Accountability for Government Furnished Material

  Action has been taken to establish better control and accountability over Government Furnished Material (GFM). The primary initiative is the development of a financial management system, as part of the DoD financial management network, to record, monitor and account for the issuance of GFM to contractors. This system will employ traditional accounting principles and standards in a manner similar to other financial systems already in place as a control over issued materials. The system

would generate financial reconciliations and accountings which do not now exist. This accountability will force contractors to be more conscientious about the use of government furnished resources, discourage requests for material in excess of requirements, correlate materials issued with finished products, and enhance recovery of unused material.

- Reduction in Contracted Advisory and Assistance Services

  The Contracted Advisory and Assistance Services (CAAS) will establish better management controls over documentation, competition and approval of services provided by consultants in this area. The initiative focuses on new requirements to maintain control over funding provided to Federally Funded Research and Development Centers and DoD funding passing through to projects situated in and managed by the Department of Energy. The controls will provide more accurate reporting of consulting costs, both in the budget justifications and the Federal Procurement Data System. This action is also responsive to the congressional concern over DoD spending on CAAS and perceptions that DoD has grown too dependent on contractors to perform work that is more appropriately performed by the Department.

- Streamlining Contract Management

  The DMR called for the consolidation of all DoD contract administration services into a single organization. These services have been divided among the three Military Departments and the Defense Logistics Agency (DLA) for many years. This initiative provides for placement and consolidation of all those functions in DLA. Consolidation should make possible the elimination of differing procedures for management contracts now in existence among the four agencies handling contract administration. It should also enhance professionalism and increase the focus and attention on contract administration. It will also make it possible to present a single face to industry on all contract management issues.

**IMPACT OF FY 1991 DECISIONS ON THE BUDGET**

A number of initiatives will improve logistics systems and save $1.4 billion in FY 1991. Initiatives to streamline administrative functions are expected to save $.3 billion. Savings of $.3 billion are anticipated from ongoing studies to consolidate, establish executive agencies, and/or achieve greater efficiencies at various support activities, such as depots and laboratories, which are discussed further in the next section. Better control of procurements and contracts will save

$.2 billion, and better procedures for developing automated management information systems will save $.1 billion. Total savings reflected in the FY 1991 budget from the initiatives equal $2.3 billion.

In addition to these direct savings, the action previously discussed to improve management of repairable items will allow the Department to propose a reduction of $2.8 billion in budget authority in FY 1991 and a total of $10 billion over the 5-year period. This is because repairable items will be bought through the DoD stock fund accounts beginning in FY 1991 instead of through the procurement accounts. Since stock funds are revolving accounts that do not require annual appropriations to obligate funds, budget authority is not required to implement this policy change. Since this is largely a budget and accounting transaction, it has not been included as a part of our DMR savings package. It is an important management improvement because it requires managers to make cost conscious choices between repair or purchase of new items.

These initiatives will continue throughout the five year planning period and the cumulative savings from FY 1991 to FY 1995 are expected to be $39 billion.

**FURTHER STUDIES/ANALYSES TO BE COMPLETED**

The decisions taken in the preparation of the FY 1991 budget to reduce the costs of providing support services have made major management improvements and resulted in substantial dollar cuts. There are, however, a number of recommendations for future management actions which require further analysis prior to decision. In keeping with the guidance in the DMR that there must be a sustained, multi-year effort to streamline the Department's management, teams of experts are being assembled to give further study to proposals in many of the same functional areas where savings were taken in FY 1991, as well as in other areas.

These proposals appear to hold promise as a means to reduce DoD costs further without affecting military capability or reducing the level of support.

- Studies of Consolidation of Management Support Operations

  Study teams will be reviewing opportunities to achieve greater efficiencies through possible consolidations, management changes, and associated savings in the following areas:

  - Supply Depots Throughout DoD

    There are 33 supply depots in the DoD system operated by each of the three military departments

and by the Defense Logistics Agency, providing supplies to all elements of the Department. Exploring consolidation in a single service or agency may result in significant reductions in base and headquarters level overhead costs, systems development costs and better utilization of existing capacity

- Inventory Control Points Throughout DoD

The three Military Departments and the Defense Logistics Agency operate separate supply functions, managing about 5 million items valued at approximately $100 billion through 20 activities called Inventory Control Points. Of the 5 million items managed, 4 million are consumables, that is, items that would be used and disposed of when they have been used. Further savings in overhead, system support, mission, and facilities costs could be achieved through consolidation, and/or other management efficiencies.

- Maintenance Depots Throughout DoD

The Army, Navy and Air Force all operate separate maintenance functions for the purposes of modification, maintenance and repair of ships, planes, tanks and other major items of equipment. Savings could be achieved in overhead reductions, closure of unneeded facilities and better oversight over maintenance operations through consolidations and/or other management efficiencies.

- Automated Management Information Systems Design Centers and Operations

The Department operates approximately 1,000 data processing installations, called information technology facilities. These facilities are engaged in software design, modification of systems, maintenance of systems, data processing operations, and administrative support. Additional cost reductions through more efficient central operations, better use of limited information technology resources and reduction in the number of staff needed are anticipated.

- Accounting Operations and Finance Centers Throughout DoD

There are four military pay systems and centers, dozens of accounting systems, and hundreds of accounting and finance stations throughout DoD. Operating savings could be realized by reducing the

numbers of systems, by a central streamlining of all accounting and finance operations. Such a move would greatly enhance the operation of a single accounting system for the Department. A decision to create such a single system was taken as part of the DMR budget process.

- Research and Development Laboratories and Test Facilities

  Each Military Department operates laboratories and test facilities. Nine facilities are engaged in work on guided missiles, 8 work on lasers, 15 on medical research, 8 on environmental issues and 6 on psychology research. Consolidation of some of these could reduce costs through reduction in overhead, streamlining operations and centralization of professional staff associated with specific areas of research and technology.

The study teams are to examine all options, challenge the present way of doing business, and make recommendations about what should be done to improve efficiency and reduce duplication. Reports from the study teams are due by May 1 to the Deputy Secretary. As previously stated, another $300 million in savings can be captured in FY 1991 through implementation of recommendations made by these study teams.

- Development of Requirements For Standard Management Information Systems

  Beyond the consolidation studies, the Department has also now committed itself to a set of major developmental efforts aimed at changing fundamentally its approach to the deployment of major automated information systems used to support the Department's business operations. The Defense Management Report called for streamlining of the Department's business and management support activities. The Department has long had multiple management information systems performing the same or very similar functions in each Service and throughout other organizational elements of the Department. The success that industry has experienced in developing integrated management information systems and in eliminating redundancy indicates that much can be done in DoD to reduce costs now associated with multiple systems.

  The Department plans to eliminate multiple systems and to implement single systems to support major functional areas important to the sound management of the Department. This decision recognized that major improvements are needed in the standardization, quality

and consistency of data produced by the Department's multiple management information systems.

In order to evaluate the depth of the problem in DoD and to give the Department guidance in developing corrective measures, an executive level group of outside experts and DoD officials has been established to recommend an overall approach for the Department and to assist in the development of a corporate information management program for the Department. The Department will begin work on the development of requirements for single systems during FY 1990 in six areas. These are:

- Civilian payroll
- Civilian personnel
- Financial management
- Warehousing
- Supply management
- Contract payment

The requirements for these six are to be developed by teams of experts over the next 18 to 24 months, with other areas to be selected in the future.

- Further DMR Management Efficiency Studies

The six analyses of possible consolidations and the six systems requirement analyses together represent a major commitment to a sustained, multi-year approach to improving management. In addition, the Department will engage in further analyses in the functional areas where emphasis has been placed thus far, and will actively search for still other management efficiencies throughout the Department. Those analyses will begin in January 1990, and will be completed in time for them to be incorporated as appropriate in the FY 1992 budget. This process will be repeated each year. The Department is committed to continuous improvement in management efficiency and effectiveness.

LEGISLATIVE PROPOSALS, REGULATORY, AND POLICY CHANGES

The maze of confusing and sometimes contradictory statues and regulations governing defense management is one of the most substantial barriers to improving management in DoD. Therefore, in addition to budget actions and planned studies/analyses, there will also a set of legislative proposals, being developed with OMB, to foster the goals of the Defense Management Report. These legislative proposals will involve such areas as production, acquisition and logistics, personnel, environment, and financial management.

DoD has begun a process to reduce the self-imposed burden of regulatory and policy guidance. Timely and favorable consideration by Congress of the proposed legislative changes will enable the Department to take a number of broad ranging actions which will produce economies and efficiencies in many functional areas.

Drawing from these initiatives, the Department seeks to encourage to revise the statutory framework governing Defense acquisition management to permit full implementation of the Defense Management Report.

DEPARTMENT OF THE ARMY
OFFICE OF THE SECRETARY OF THE ARMY
WASHINGTON, D.C. 20310-1600

11 JANUARY 1990

INFORMATION FOR MEMBERS OF CONGRESS:

> *"The quest for excellence in defense management will be successful only if a new management philosophy can replace the old."*
>
> - PACKARD COMMISSION

Given the challenge of the Defense Management Review (DMR), the Army responded by making changes in its organizational management and philosophy across the spectrum of its management responsibilities. These new azimuths have already allowed the Army to move forward to improve its management system and to more effectively manage its resources.

Our commitment to full implementation of the DMR initiatives is not tied to a single program or method, but encompasses a wide range of efforts networked to form a powerful system for change. The cumulative effect of these actions is a major institutional effort to enhance productivity and quality.

To meet the civilian personnel resource reductions for Fiscal Years 90 and 91, the Army plans to use only the least severe options, such as curtailment of TDY, overtime, and other discretionary spending, prior to instituting actions adversely affecting the pay or jobs of civilians. The use of a Reduction In Force (RIF) will be used only as a last resort to achieve long-term savings.

This paper will address three major areas:

- The Acquisition Management Structure
- The Army Acquisition Corps
- Management Initiatives

## ACQUISITION MANAGEMENT STRUCTURE

*". . . central to [the Packard Commission's] conception was the establishment of clear, abbreviated lines of authority within the Services for the performance of their traditional role in managing major programs."*

- Defense Management Report

The Army began implementing the recommendations of the Packard Commission and the Goldwater-Nichols Act in January 1987. The Army Secretariat and Staff were reorganized to reduce layering and reduce the size of the Headquarter's Staff. The Office of the Comptroller of the Army was moved under the Assistant Secretary of the Army for Financial Management [ASA(FM)], the Assistant Secretary of the Army for Research, Development and Acquisition [ASA(RDA)] was bolstered by incorporating the Office of the Deputy Chief of Staff for Research, Development and Acquisition, and the Director of Information Systems for Command, Control, Communications and Computers was established to oversee information policy.

As the Army undertook to further improve upon what had already been done, it charted a course of acquisition structural and procedural changes to more efficiently and effectively run the business of the Army. Building upon the Packard Commission recommendations, the Army developed a three-tier reporting chain for program management consisting of the Army Acquisition Executive (AAE), Program Executive Officers (PEOs), and Project/Product Managers (PMs). These actions:

Established clear, abbreviated lines of authority

Removed unnecessary layers

Streamlined the decision process

**ARMY ACQUISITION EXECUTIVE** The Secretary of the Army appointed the first Army Acquisition Executive in March 1987, naming the Under Secretary of the Army as his hands-on, day-to-day acquisition representative. In May 1989, when the Under Secretary assumed collateral acquisition duties in the Office of the Under Secretary of Defense for Acquisition, the Secretary named the Assistant Secretary of the Army (Research, Development and Acquisition) [ASA(RDA)] as the AAE

and Senior Procurement Executive with full-time responsibility for acquisition functions. Upon the resignation of that official, the Secretary of the Army became the acting AAE until a new ASA(RDA) nominee is confirmed by Congress. Once this position is filled, it will again be designated as the full-time AAE.

**PROGRAM EXECUTIVE OFFICERS** At the same time the AAE position was created, the Program Executive Officer (PEO) structure was also established. These PEOs, both military and civilian, are selected by the Secretary of the Army based upon recommendations by the AAE in coordination with the Army Chief of Staff. These PEOs report directly to the AAE and oversee a number of individual programs that support related missions. For example, the PEO for Heavy Force Modernization oversees tank and fighting vehicle programs.

**PROJECT/PRODUCT MANAGERS** The third tier in the Army's acquisition management structure consists of Project and Product Managers (PMs). Responsible for managing the day-to-day acquisition activities of assigned systems or programs, PMs are charged with managing and executing the development, production, and fielding of a system in accordance with approved performance, schedule, and cost requirements.

**PEO RESOURCE CONTROL**

> *". . . FUNDING AND PERSONNEL AUTHORIZATIONS FOR PEO OFFICES. . . WILL BE ADMINISTERED SEPARATELY FROM SERVICE COMMANDS."*
>
> - Defense Management Report

The Army is revising its resource support system structure for the PEOs to improve their control over the funding and manpower resources they need to carry out their responsibilities. With respect to both dollars and personnel authorizations, PEOs and subordinate PMs will draw their resources directly from HQDA rather than from the materiel commands. The materiel commands will continue to provide a variety of support services without duplicating any of the PEOs' or PMs' management functions. This enhanced resource control system will help ensure that PEO and PM managed programs operate as centers of excellence, managed with modern efficient techniques, without administrative burdens or materiel command layers being inserted into the chain of command.

## THE ARMY ACQUISITION CORPS

*". . . it is vitally important to enhance the quality of the defense acquisition workforce -- both by attracting qualified new personnel and by improving the training and motivation of current personnel."*

- Packard Commission

The Army Acquisition Corps (AAC) addresses that portion of the Defense Management Review concerning development of a dedicated corps of acquisition specialists. In so doing it complies with Public Law 99-145 and proposed Department of Defense Directive 5000.52 which establish specialized training and development requirements for specific acquisition positions. These "critical positions" encompass specific military and civilian positions located in Program Executive Offices, Project/Product Management Offices, and selected support and staff positions in matrix support commands and headquarters offices. The AAC is composed of the military and civilian specialists occupying these positions as well as candidates being developed to compete for future assignment to them.

This initiative takes full advantage of the work already accomplished by the Logistics and Acquisition Management Program (LOGAMP), the Materiel Acquisition Management (MAM) Program, and the Acquisition Management Mission Cluster Group. It greatly improves upon these programs and, more importantly, fully integrates the military and civilian acquisition programs into one. This will be a Total Army program. A single office will manage the AAC, to include developmental efforts and assignments for both military and civilian personnel. The new acquisition program is designed to eliminate problems identified by prior studies of both the MAM and LOGAMP programs.

The AAC provides for the competitive selection of military and civilian candidates into a common developmental pool; develops them in accordance with Public Law and DoD guidance; and provides for competitive promotion, from within the pool, into critical positions. Mobility related to missions and development needs is a requirement for civilian as well as military personnel.

For the military community, officers will enter the AAC at their eighth year of service. Fully funded advanced civil schooling (ACS) will be offered to all future military participants for education in scientific, technical, and managerial disciplines. Selection for Command and Staff College (CSC), Defense Systems Management College (DSMC), and Senior Service College (SSC) will remain unchanged. Officers in the program will be groomed through acquisition developmental assignments. The corps of acquisition officers will not require battalion or brigade command experience, but will concentrate on critical acquisition management assignments. Promotion policy and guidance will be structured to ensure potential for advancement from company grade to flag rank.

For the civilian community, the corps will draw from existing civilian career programs at grades 13 and above. Those programs will have already provided much of the required specialized training and experience. As necessary, individuals will be further groomed through schooling and developmental assignments. Legislation is being recommended that would permit paying for degrees for civilians. Such legislation will offer advanced civil schooling to civilian personnel identical to what is now offered to military participants. In addition, brief orientation courses will provide civilian personnel with an improved materiel user perspective. Civilians will remain eligible to compete within their career program, but will focus more directly on acquisition opportunities. The civilian program will also provide for promotion opportunity from GS-13 through SES grades.

We are convinced this is the right direction for the Army to take in developing the leadership and expertise needed to successfully acquire materiel and weapon systems to meet Army requirements now and in the future.

## MANAGEMENT INITIATIVES

> *" [Implementation of the Packard Commission recommendations] should allow for a substantial reduction in the total number of personnel in the defense acquisition system. . . ."*
>
> - Packard Commission

In addition to forming a professional Acquisition Corps and streamlining the acquisition management structure, the Army is considering a number of initiatives designed to meet the goals of the Defense Management Report.

**STREAMLINE AMC** The Army Materiel Command's mission has been and will continue to be performed in accordance with the streamlining and efficiency improvement objectives outlined by the Packard Commission and the DMR. For example, over 14,000 personnel spaces have already been cut from AMC's organizational structure over the past three years. Additional spaces will be removed as a result of DMR-related initiatives. This additional reduction can best be realized by capitalizing on the full range of efficiency and economy opportunities that exist within AMC. AMC Headquarters will no longer emphasize management of programs, projects, or commodities on an individual basis. Instead, it will focus on command and control, policy, planning, program integration, resource allocation, and performance evaluation relating to execution of its three primary missions: (1) providing logistical support; (2) managing programs other than those conducted under the PEO structure; and (3) providing a variety of support services to PEOs and PMs while duplicating none of their functions.

**CONSOLIDATE ARMY LABORATORIES** A study group is addressing various means to improve the quality of Army Labs and to enhance management efficiencies.

**CONSOLIDATE ARMY TEST AND EVALUATION(T&E)** The Army will study various means to enhance management efficiencies within its test and evaluation communities.

**STREAMLINE CONTRACT ADMINISTRATION SERVICES (CAS) AT ARMY AMMUNITION PLANTS (AAP)** This initiative will upgrade the quality of the workforce by providing a more efficient and effective organization dedicated to CAS functions at each AAP.

**STREAMLINE INFORMATION SYSTEMS COMMAND (ISC)** The elements of the Information Systems Command were reviewed to determine where efficiencies and savings may be obtained.

**LOGISTICS SYSTEMS IMPROVEMENTS** This includes consolidating selected wholesale and retail logistics functions; reducing inventory of outmoded major items and retention level stocks with no known requirements; reducing materiel returns and consolidating supply support for maintenance depot operations.

**REDUCING SUPPLY SYSTEMS COSTS** Savings are anticipated through reductions in spare and repair part inventory. The basic concept provides tools to wholesale level supply managers which improve visibility and control over the costs of buying, storing, and issuing stock fund items.

**STOCK FUNDING OF REPARABLES** This initiative includes the transfer of funding of reparables from direct appropriations to the Army Stock Fund.

**REDUCE WHEELED VEHICLE SUPPORT COSTS** This initiative removes numerous overage, overmileage and obsolete vehicles from the Army fleet. Savings will be experienced through reduction of operating and support costs.

**REDUCE TRAVEL COSTS** Travel costs will be significantly reduced; however, travel funds for recruiting, military student professional development and military schools and leasing of non-tactical vehicles used in tactical units will not be reduced.

**CIVILIANIZATION OF MILITARY SPACES IN SUPPORT FUNCTIONS** DOD will substitute civilian manpower for military in positions not specifically requiring a military incumbent. Generally, overhead support-type functions can be performed by civilians. These functions include



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Installations Management, Management Headquarters for Support Commands, Research and Development, Training and Personnel, Joint Activities, and Support Activities. Also, civilians are less costly than military personnel.

**STREAMLINING THE CIVILIAN PERSONNEL SYSTEM** The Army will streamline its civilian personnel system and increase the ratio of personnel serviced, by delegating additional responsibilities to line managers.

**STREAMLINING DEFENSE CONTRACT MANAGEMENT** The DMR called for the consolidation of certain DOD Contract Administration Services (CAS) in a single organization. This initiative provides for the transfer of CAS at tank plants and Army Plant Representative Offices to DLA.

**CONTRACTED ADVISORY AND ASSISTANCE SERVICES** Efforts are being directed at: (1) expanding the visibility of Contracted Advisory and Assistance Services via the budget review process; (2) clarifying and refining definitions in this area; and (3) educating DOD managers, users and procurement personnel regarding documentation, approval and reporting requirements.

**SINGLE DOD BUSINESS INFORMATION SYSTEMS** The DOD will experience a reduction in the costs of business information systems as a result of eliminating redundant systems and streamlining functional requirements. DOD will establish standard ADP systems resulting in the long term, in a Corporate Information Management System for the DOD.

**MOVING FROM LEASED SPACE ONTO MILITARY FACILITIES** This initiative will require legislation to establish a revolving fund to finance renovation or construction of DOD on-base facilities to enable the movement of DOD activities from leased space to on-base facilities.

**REDUCING TRANSPORTATION COSTS** The Army will use 5 initiatives to cut military services' transportation budgets in FY91-95. They are: (1) Guaranteed Traffic Program; (2) Regional Freight Consolidation Centers; (3) Issue Priority Group (IPG) policy; (4) Direct shipments from vendors to users; and (5) Prepayment audits.

**REDUCING ELECTRIC COSTS** The Army will join with DOD in an attempt to obtain additional low-cost federally-owned hydroelectric power.

**REDUCING THE COST OF CLOTHING AND TEXTILES** The Army will participate with the other services, OSD, and DLA in a series of initiatives designed to reduce the cost of clothing and textiles. Among these initiatives are aggressive pursuit of commercial specifications and consolidation of specification development.

**ACCOUNTING FOR GOVERNMENT FURNISHED MATERIAL (GFM)** Accounting principles and standards as well as prudent financial management practices dictate government furnished material must be retained under continuous DOD accounting and financial management control.

**CONVENTIONAL AMMO WORKING CAPITAL FUND (CAWCF)** The Army will institute a stabilized rate policy for the CAWCF to prevent price changes from causing fluctuations in production rates during the year. The elimination of unnecessary fluctuations will provide for smoother, more economical rates of production, thereby lowering costs.

**DMR CONSOLIDATION STUDIES** OSD will establish study teams to review possible consolidations/streamlinings of: (1) Supply Depots; (2) Inventory Control Points; (3) Aeronautical Depot Maintenance; (4) Non-Aircraft Depot Maintenance; (5) ADP design and operations; (6) Accounting and Finance centers; and (7) R&D Labs and T&E facilities. Results of these studies will be available in May 1990.

PROVIDED BY:

Office, Chief of Legislative Liaison

# DEPARTMENT OF THE NAVY

SUMMARY OF

PLANS FOR INITIAL IMPLEMENTATION

OF THE

# DEFENSE MANAGEMENT REPORT

## SUMMARY

On 13 July 1989, the Secretary of Defense released the Defense Management Report (DMR) to the DOD Components for implementation. The DMR required the Secretary of the Navy to submit plans not later than 1 October 1989 to the Secretary of Defense which provide for, among other things:

1. Establishment of a single Assistant Secretary of the Navy as the Service Acquisition Executive, with full-time responsibility for all Navy and Marine Corps acquisition functions.

2. Establishment of Program Executive Officers (PEOs) through whom the SAE will manage major acquisition programs, each (PEO) to have a small, separate staff organization and devote full-time attention to management of assigned programs and related technical resources. Refocus of the Navy Systems Commands and the Marine Corps Research, Development and Acquisition Command to provide necessary logistic support to the PEOs, manage programs other than those assigned to PEOs, and provide a variety of support services to PEOs and PMs without duplicating their management functions.

3. Establishment of a dedicated corps of officers in the Navy and Marine Corps who will make a full-time career as acquisition specialists.

On 17 July 1989, the Secretary of the Navy established the Department of the Navy Management Review Task Force to conduct DMR implementation planning within the Department of the Navy. The Task Force, comprised of more than 100 military and civilian personnel organized into six Working Groups, conducted detailed planning in accordance with the DMR and additional formal written guidance provided by the Secretary of the Navy. On 2 October 1989, the Secretary of the Navy approved the plans recommended by the Task Force and forwarded them to the Secretary of Defense. The Secretary of Defense has approved the plans.

The principal findings and changes contained in the plans as approved are summarized as follows:

## SECRETARIAT REORGANIZATION

At present, the Secretary of the Navy serves as the Senior Acquisition Executive (SAE) for the DON, and is the single office or entity designated under 10 U.S.C. 5014 to conduct the acquisition function within the headquarters elements of the DON. Within the Navy Secretariat, the NAE is assisted in doing so by the Assistant Secretaries of the Navy for Research, Engineering and Systems (ASN(RE&S)), and Shipbuilding and Logistics (ASN(S&L)), and their staffs.

This organizational arrangement has been criticized by the General Accounting Office upon the ground that the assignment of substantial responsibility to the ASNs RE&S and S&L does not comport with the requirement of 10 U.S.C. 5014 that a single office or entity within the Navy Secretariat conduct the acquisition function. The DMR provided a basis for resolving this concern, by requiring that a single Assistant Secretary of the Navy be designated the SAE. Upon review of 10 U.S.C. 5014, the Secretary of the Navy determined that in order to comply with both the statute and the DMR, it would be necessary to establish a

single Assistant Secretary of the Navy with sole responsibility within the headquarters elements of the DON for conduct of the research and development and acquisition functions, less matters pertaining to military requirements and test and evaluation which have been delegated to the Chief of Naval Operations (CNO) and the Commandant of the Marine Corps (CMC).

The Secretary of the Navy further determined to address certain other issues in the course of the necessary reorganization:

- Consolidation of responsibility for automated data processing (ADP) acquisition under the ASN(RD&A).
- Coordination of international acquisition matters.
- Establishment of a single special Secretariat focal point for all aspects of antisubmarine warfare research, development and acquisition.
- Establishment of the Under Secretary of the Navy as the focal point within the Secretariat for Total Quality Management initiatives.

**Assistant Secretary of the Navy (Research, Development and Acquisition)**

This plan will disestablish the ASN(RE&S) and ASN(S&L), and consolidate responsibility for all aspects of the research and development, acquisition and information resources management functions under a single Assistant Secretary of the Navy for Research, Development and Acquisition (ASN(RD&A)). Within the office of the ASN(RD&A), the plan

- Designates the ASN(RD&A) as the Navy Acquisition Executive, Navy Senior Procurement Executive, and Senior DON Information Resource Management Official.
- Provides a streamlined chain of command directly from the ASN(RD&A) through Program Executive Officers (PEOs) for assigned major acquisition programs (or SYSCOM Commanders for programs under their cognizance) to acquisition Program Managers.
- Transfers the information resource management function from the ASN (Financial Management) to the new ASN(RD&A).
- Clarifies the responsibilities of the Chief of Naval Research for policy and oversight pertaining to 6.1, 6.2 and 6.3A funds, Corporate Laboratories and Navy R&D Centers.
- Consolidates responsibility for international aspects of research, development and acquisition programs under the ASN(RD&A).
- Establishes a single Directorate for Antisubmarine Warfare as a focal point for all aspects of research, development and acquisition of antisubmarine warfare and undersea surveillance systems.
- Establishes a Director for Acquisition Workforce Education and Training to coordinate and oversee planned enhancements of DON military and civilian acquisition professional programs reporting to the ASN(RD&A).

**Assistant Secretary of the Navy (Installations and Environment)**

The plan will also establish an Assistant Secretary of the Navy for Installations and Environment, with policy and oversight responsibility for Navy and Marine Corps installations, facilities, safety, environmental affairs and shore resources management.

**Total Quality Management**

Finally, the plan will establish the Under Secretary of the Navy as the focal point for Total Quality Management leadership within the Department.

**Streamlining of Secretariat Oversight**

The plan to disestablish the ASNs (RE&S) and (S&L), and establishment of the ASN (RD&A) and (I&E) reflects a significant consolidation and streamlining of Secretariat oversight of the acquisition process. The plan eliminates duplicative efforts previously performed both within the two Secretariat acquisition organizations, and between the Secretariat and the Office of the Chief of Naval Operations (OP-098). Moreover, the plan reflects additional personnel savings as a result of the Secretary of the Navy's decisions to empower the cognizant PEO or Systems Commander to approve acquisition plans for all assigned programs, and to empower the cognizant Head of Contracting Activity (HCA) to approve business clearances for major programs, without routine prior review by advocacy and other offices within the Secretariat. These consolidation and streamlining actions are consistent with the DMR's emphasis on vesting PEOs/SYSCOM Commanders and Program Managers with full authority and accountability for cost, schedule and performance of their programs.

As a consequence of these consolidation and streamlining actions, the plan proposes a reduction in the current Secretariat-level staff actually devoted to the acquisition function from 270 to 208, a 23% decrease, and a reduction in the personnel currently devoted to the functions to be assigned the ASN(RD&A), ASN(I&E) and the Under Secretary from 305 to 253, a decrease of 17%. The Task Force report reflects the view of a majority of the members of the Secretariat and PEO-SYSCOM Working Groups that further substantial reductions will be achievable in the light of experience with the new Secretariat organization, and the plan challenges the new ASN(RD&A) to identify additional reduction and streamlining opportunities during the initial period of implementation.

## PEO AND SYSCOM REORGANIZATION

At present, major acquisition and other weapons programs are executed within the DON by and through five major commands:

- Commander, Naval Sea Systems Command (NAVSEA)
- Commander, Naval Air Systems Command (NAVAIR)
- Commander, Space and Naval Warfare Systems Command (SPAWAR)
- Director, Strategic Systems Program Office (SSPO)

- Commanding General, Marine Corps Research, Development and Acquisition Command (MCRDAC)

These Commanders serve as Program Executive Officers for assigned major programs, reporting for this purpose to the Service Acquisition Executive. The Commanders, Naval Supply Systems Command (NAVSUP) and Naval Facilities and Engineering Command (NAVFAC) also have significant responsibilities for acquisition of property and services other than weapons systems.

Since the abolition of the Naval Material Command in 1985, these commands have reported to the Service Acquisition Executive directly, with no intervening or collateral four-star acquisition or logistics command. Indeed, the Department of the Navy has heretofore implemented the Packard Commission's recommendations regarding a streamlined, three-tier acquisition reporting chain for major programs (SAE-PEO-PM) by designating these commanders as the Navy and Marine Corps PEOs.

However, the DMR requires that PEOs be established and administered separately from Service System Commands, and that PEOs report directly to the SAE on all matters of cost, schedule and performance regarding assigned programs. Accordingly, the plan provides for establishment of 7 PEOs and 3 Direct Reporting Program Managers, as follows:

- PEO for Tactical Aircraft Programs
- PEO for Antisubmarine Warfare Aircraft and Other Systems
- PEO for Cruise Missile and Unmanned Air Vehicle Programs
- PEO for Submarine Weapons and Combat Systems
- PEO for Surface Antisubmarine Warfare Systems
- PEO for Space, Communications and Sensors
- PEO for Expeditionary Force Programs
- Direct Reporting PM for Strategic Systems
- Direct Reporting PM for AEGIS
- Direct Reporting PM for SSN-21

Under the literal terms of the DMR, all of the 51 major (Acquisition Category (ACAT) I) programs managed by the Department of the Navy would be required to be transferred from the cognizance of the Systems Commanders to a PEO or Direct Reporting PM. However, it is equally clear under the DMR that the Systems Commands are to retain responsibility for logistics and life-cycle support of all acquisition programs, including those assigned to a PEO or Direct Reporting PM. These matters predominate once a system has reached mature, stable production. At the same time, elements of program risk which most strongly warrant intensive management of a system through a PEO or Direct Reporting PM are generally associated with development, not production. Finally, span of control concerns, the need to minimize redundancies in management structures, and other

considerations counsel creation of the minimum number of PEOs and Direct Reporting PMs necessary to implement the DMR principles of intensive, full-time, streamlined management of the high-dollar risk attendant to major development programs.

For these reasons, the Task Force recommended, and the plan provides that the Systems Commands retain PEO responsibility for certain ACAT I programs which are in mature, stable production; are not subject to any planned major block upgrades; and which do not presently involve any substantial matters of controversy or significant Defense Acquisition Board (DAB) issues. Accordingly, the plan provides for transfer of 30 of the 51 Navy and Marine Corps major programs to PEOs or Direct Reporting PMs, and retention of the remainder within the cognizant Systems Command. The bulk of the programs proposed for retention within the Systems Command are shipbuilding programs involving mature, stable designs. Retention of the ACAT I programs proposed within Systems Command cognizance is subject to case-by-case review and approval by the Under Secretary of Defense for Acquisition. This review will be completed as a matter of implementation of the plan.

At the same time, the Task Force identified a limited number of nonmajor acquisition programs which are integral to the success of major programs proposed for assignment to a PEO or Direct Reporting PM, and will therefore be transferred from SYSCOM cognizance along with their associated major program. An example is the MK-50 Engine Upgrade Program, which is plainly critical to the ACAT I MK-50 Torpedo Program itself.

Accordingly, the plan provides for transfer of a total of 78 (30 major and 48 related nonmajor) programs, valued at more than $19 billion, to PEOs or Direct Reporting PMs. Approximately 1500 program personnel will be reassigned from the System Commands to the new PEO and Direct Reporting PM organizations.

The plan prescribes a notional PEO organization in which the PEO is assisted by a staff of from 10 to 16 persons, providing the PEO direct support in four areas considered essential to the exercise of authority and accountability for cost, schedule and performance of assigned programs: technical management; configuration and logistics management; acquisition management; and business and financial management. PEOs and their assigned PMs will receive other support, including legal, contracting and matrix engineering support, from their supporting Systems Command as provided by Memoranda of Understanding or Agreement (MOU/A).

## THE ACQUISITION WORKFORCE

The Department of the Navy's senior acquisition workforce is comprised of both civilians and military officers, and has a substantially higher proportion of civilians in key positions within the Secretariat and the Systems Commands than is the case in the other Military Departments. Military officers assigned to important acquisition positions are generally drawn from one of the following communities, depending upon the expertise desired:

-- Engineering Duty (Restricted Line) (ED)

-- Aviation Engineering Duty (Restricted Line) (AED)

-- Supply Corps (SC)

-- Civil Engineer Corps (CEC)

-- Unrestricted Line Materiel Professionals (MP)

-- Weapon System Acquisition Mangers (WSAM) [Not really a community, but a program which draws upon all communities.]

The Marine Corps presently identifies officers deemed qualified for acquisition management positions by means of an additional Military Occupational Specialty (MOS) as an Acquisition Management Officer (AMO). However, there are no specific education, training or experience requirements for designation as an AMO other then primary MOS qualification, completion of the appropriate prerequisite training at the Defense Systems Management College, and on-the-job training.

The DMR requires each Service to establish a dedicated military acquisition corps of officers. Participating officers would be identified not later than 10 to 12 years of service, and would thereafter devote themselves exclusively to a specialization in acquisition.

The Task Force reviewed career management within each community, and determined that ED, AED, SC and CEC officers are presently managed in a manner which fulfills the specialization requirement of the DMR. With respect to the Unrestricted Line, the Task Force determined that the existing URL Material Professional Program does not comply with the terms and purpose of the DMR, primarily because it permits designation as an MP at the O-6 (Navy Captain/Marine Colonel) level without firm requirements for prior acquisition experience. Nor does the WSAM Program, because WSAM officers are not managed intensively to develop acquisition experience. For the same reasons, the Marine Corps AMO Program does not comply.

At the same time, the Task Force determined that the recent operational experience and current knowledge of fleet and Fleet Marine Force requirements possessed by current MP and AM officers is an invaluable and critical perspective in successful program management. In order to fulfill the DMR's purpose of assuring that military officers possess sufficient acquisition expertise prior to assuming key acquisition positions, and at the same time preserve the invaluable "user" perspective which can only be derived through direct experience, the Task Force proposed, and the plan provides for, the identification of URL officers for specialization in acquisition earlier than the 10 to 12 year point. The plan assures at least eight years of intensive acquisition education and experience prior to assignment to key acquisition billets, and permits continued assignment to identified acquisition-related operational tours -- including command -- through the O-5 (Navy Commander/Marine Lieutenant Colonel) level.

The plan strengthens the existing Navy MP and Marine Corps AM programs in seven major respects:

-- The plan requires 8 years of acquisition education and experience prior to assignment to key acquisition positions. The current MP and AM programs require no specific acquisition management experience prior to designation as a MP or AMO and assignment to key acquisition assignments.

-- In the plan, all shore duty after designation as an acquisition specialist must be in acquisition training or acquisition billets. As currently structured, shore duty for prospective MPs and AMOs need not be related to acquisition.

-- The plan requires a Masters degree or equivalent in a technical or acquisition management field. Test pilot school, which is primarily Aeronautical Engineering, and Nuclear Power training are under consideration for equivalency. Post-graduate education is not now required for designation as a MP or AMO.

-- The plan requires the Defense Systems Management College (DSMC) Program Management Course prior to assignment to all key acquisition management jobs. Currently the DSMC course is only required prior to assignment as a Major Program Manager.

-- Under the planned program, exclusive assignment to acquisition billets ashore for the remainder of a career will occur at the senior Commander/Lieutenant Colonel level. Dedication to acquisition jobs will occur earlier for most URL-MPs than in the current program. The only current MP billets are at the Captain and Flag ranks.

-- The plan provides for selection of MPs/AMOs following initial warfare qualification between 4 and 12 years of service. Currently Navy MPs are selected following qualification for command as Commanders and serve in the their first MP billet as Captains following their command tour.

-- The management of an officer's career would be focused on acquisition from initial selection as an MP/AMO at the rank of Lieutenant or Lieutenant Commander vice completion of a command tour under the current MP program. For example, operational assignments can be managed to emphasize new construction and maintenance-related operational experience in platforms in which the officer will become an acquisition manager.

**Civilian Workforce Initiatives**

Although the DMR requirements address only the military acquisition workforce, balance in the development of the total workforce within the Department of the Navy requires attention to the civilian workforce as well. Accordingly, the Secretary of the Navy directed the Task Force to prepare a plan to strengthen the professional development of our civilian workforce as well. The plan proposed builds upon the existing Civilian Material Professional (CMP) program, but substantially strengthens it in the following respects:

-- Commands managing acquisition category (ACAT) programs or significantly influencing them are required to establish CMP programs and identify their key acquisition positions. Those positions are to be filled by CMP-certified employees, except in very unusual cases.

-- Competitive selection into CMP candidate programs is required

— Candidacy will be limited to GM-13s and above,

— Level 4 performance rating or higher will be required to be selected as a CMP candidate.

– Requirements for certification as a Civilian Material Professional will be:

— Eight years acquisition experience, at least two of which are in a procurement command

— Bachelor's degree

— DSMC Program Management Course, or equivalent

— Three three-month rotations prior to certification

— 80 hours supervisory training

— 160 hours management development training

— Two most recent performance ratings at level 4 or higher

– Commands are to establish advanced development programs for selected certified CMPs. These programs will provide experiences such as extensive rotations, graduate level education, and training in senior service schools. Employees in these programs will be those anticipated to fill the most senior acquisition management positions including potential for major PM/PEO.

SECRETARY OF THE AIR FORCE
WASHINGTON

January 11, 1990

INFORMATION FOR MEMBERS OF CONGRESS

AIR FORCE DEFENSE MANAGEMENT REVIEW PROGRESS REPORT

There are two distinctive features to DMR in the Air Force. The first is its scope. From the outset, our goal has been to apply the spirit of DMR - finding smarter, streamlined, more cost-effective ways of doing business - across the spectrum of Air Force management activities. The second is its emphasis. We stressed that DMR was not a budget exercise. Our focus was on generating ideas with no specific dollar goals assumed or assigned at the outset. DMR is an open invitation to the people of the Air Force to help the Air Force surface innovative approaches to make more effective use of Air Force resources.

Initiatives generated by the "top-to-bottom" approach established in support of DMR will produce higher effectiveness, efficiencies and savings across the Air Force. Approaches include reduced training costs, reduced maintenance costs, creating a new acquisition structure and related procurement structure to more clearly define lines of authority and responsibility, restructuring major air command staffs, restructuring functions and staffs in the Air Staff and the Secretariat, and major streamlining of overhead and functional support within our acquisition commands.

Despite the potential both for cynicism about "one more" management program and for resistance to the major changes implicit in DMR, the principal reason for the quality and quantity of the inputs we received is that the Air Force community has recognized DMR as an idea whose time has come. Senior civilian and military Air Force leaders have strongly endorsed support of DMR and actively participated in implementation. Participation from field commands, the Air Staff, and the Secretariat have produced well over 500 proposals. The Secretary of the Air Force and the Chief of Staff "primed the pump" with direction to examine several specific areas where functions might be streamlined, consolidated, or eliminated. And finally, the Air Force, at all levels clearly understands that the alternative to implementing efficiencies is even more drastic reductions in force structure and modernization. In the on-going budget process, the savings from these efficiencies will help us meet our obligations in a constrained fiscal environment.

Taskings, Decisions, and Savings

We addressed taskings in three general categories. Specific tasks were listed in the Secretary of Defense's Report to the President and focus on acquisition matters. Collateral tasks for the Air Force are associated with support to DoD task forces working on specific tasks called out in the DMR. The third category is derived tasks -- those oriented towards management efficiency and streamlining outside the defined acquisition area. Air Force decisions to date have initiated implementation of more than 75 initiatives, and all have been considered under the National Environmental Policy Act (NEPA). Most of these proposals consist of budgetary, manpower, or internal organizational changes with little environmental implications. We determined that they qualified for one or more of the Air Force's categorical exclusions. A limited number of these proposals, however, will require further environmental analysis before final decisions can be made. We intend to pursue these proposals contingent upon the outcomes of the environmental process.

It is also clear that the success of many of the initiatives depends on factors external to the Air Force. Strong support from DoD will be critical in dealing with other government agencies, the Congress, and with our allies. Specifically, some proposals will ultimately require Congressional approval and consultation with allies. A coordinated plan of Congressional and host nation notification and public release will be essential.

Although improvements in the acquisition area should lead to significant cost avoidance, we will draw from the derived tasks to accomplish the specific dollar savings called for in the DMR. Some initiatives leading to longer term savings will require upfront investment. However, these one-time, upfront costs are allowed for in our plans and the anticipated net savings identified to date are substantial. Initiatives are under continuing review and will be resolved in the course of future budget and program cycles.

The Review Structure

We established a small Executive Group with the authority to oversee all Air Force activities in support of DMR. Co-chairs are the Under Secretary and Vice Chief of Staff. A set of panels and task forces, reporting to the Executive Group, examined the individual proposals and issues. Separate panels in the acquisition-specific area covered acquisition structure, acquisition management, acquisition career development, acquisition policy and resource allocation, and procurement policy. Panels dealing with

issues other than acquisition activities included logistics structure/policy, resource allocation, organizational streamlining, force structure, and personnel policy. Three separate task forces addressed Air Force Systems Command/Air Force Logistics Command (AFSC/AFLC) restructuring, Air Force Communication Command (AFCC) streamlining, and Air Staff/Secretariat restructuring.

The Executive Group continues to track implementation of acquisition specific tasks and the "pump primers", assign responsibilities and due dates for review of inputs from the commands, Air Staff, and Secretariat, and provide first order sifting and assessment. The Secretary of the Air Force and the Chief of Staff then evaluate the proposals and choose the most promising initiatives.

In consonance with the overall streamlining called for by the DMR, we are also examining our financial management functions and structure to eliminate duplication and overlap and to fix responsibility. All elements of financial management (budget formulation, review, enactment, cost, accounting and finance) are being reviewed carefully, both for short-term and longer term improvements.

Restructure of the Air Staff/Secretariat

The Air Staff and Secretariat are receiving close scrutiny as a part of the process. Pursuant to legislative requirements and the DMR principles, the Air Force has already implemented some changes in our headquarters. The Office of the Assistant Secretary for Financial Management has been established with a strengthened charter and consolidation of financial functions that had been spread among other headquarters offices. To improve the quality of staff work supporting the Chief and the Secretary and to better integrate the Secretariat and the Air Staff, we have formed the Air Force Council, Air Force Board, and Program Review Committees with appropriate level membership from both Secretariat and Air Staff offices. These changes should make our headquarters staff work and PPBS processes more effective by integrating the work of military and civilian staffs, as well as ensure that our guidance and tasking to the field is better coordinated and consistent.

Specific Tasks

Acquisition Structure

The Assistant Secretary of the Air Force for Acquisition will continue to be the Service Acquisition Executive (SAE) and have responsibility for all Service acquisition functions.

For major programs and selected others, responsibility and program management authority flows directly from the SAE to the

Program Executive Officers (PEOs) to Program Managers (PMs). PEOs will have no other responsibilities and will report to no one on program management outside the SAE/PEO chain. For other than major and selected programs, AFSC Product Division and ALC Commanders are responsible for overseeing program management. Responsibility flows directly from the SAE to them. The SAE may designate special interest programs as Executive Programs and include those programs in the direct chain. When so designated, oversight and reporting requirements are the same as for major programs.

AFSC and AFLC Commanders continue to be responsible for planning all required support throughout the life of all programs. These Commanders will recommend, for SAE approval, major program assignments to a PEO and coordinate with the SAE on other program assignments. AFSC/CC and AFLC/CC will be directly responsible to the SAE for support to PEOs and PMs. The quality and availability of support to PEOs and PMs will assure that SPO staffs remain as small and efficient as possible.

The key to the major systems acquisition structure is the PEO. We will establish the PEO as a senior operating official with the authority, responsibility, and accountability for a portfolio of related programs. The PEO is to be a planner of corporate strategies and objectives, a problem-solving team leader supported by acquisition commands.

We will carefully monitor the implementation of these changes and continue to fine-tune assignments and responsibilities as needed to ensure full compliance with the spirit and intent of the DMR.

Contracting Authority

Although the issue of contracting authority was not a specific DMR task, it is integral to the overall acquisition process. We have aligned contracting authority so that the procurement structure meshes with the acquisition structure. The Service Acquisition Executive (SAE) is also the Senior Procurement Executive (SPE). The SPE retains HCA (Head of Contracting Activity) authority for major and other programs. The SPE will delegate HCA authority to major commands for other contracting and delegate substantial authority for major programs through the PEO to the program office. Contracting strategy, planning, and contract clearance will be provided as a service for the SPE and PEOs by the acquisition command headquarters consistent with thresholds specified by the SPE.

This structure will allow optimum use of current contracting expertise, avoid layered or new staffs, and ensure consistency on strategy and reviews, while keeping the contracting authority for programs closely aligned with the SAE/PEO/PM structure.

Restructure of the Acquisition Commands

Air Force Systems Command (AFSC) and Air Force Logistics Command (AFLC) have developed streamlining plans that would, over time, significantly reduce their manpower. Both commands have recognized that their activities are fundamentally business operations that need not copy the hierarchical structures of operational military commands. They have adopted the philosophy that authority and responsibility should be vested at the lowest reasonable level and all staffs and functional oversight above that level must be justified on the basis of value added.

AFSC actions include headquarters reductions, consolidations, streamlining SPOs and various functional support activities. In AFLC, actions include headquarters consolidations and reductions, elimination of certain middle management structures, redesigning processes, streamlining reporting structures, exploiting automation of information, merging certain support functions, and consolidating functional organizations into line operating organizations. The number of entities reporting to the AFLC Commander is reduced from 50 to 22. In both commands, reductions will be phased to avoid RIF actions, relying instead on hiring freezes, early retirements, and similar measures. The commands are proceeding with detailed implementation plans.

Air Force Communications Command (AFCC), because it has acquisition responsibilities, was also examined. Our review of AFCC for acquisition streamlining continues, but in other areas, major decisions are already being made. AFCC has identified potential manpower savings. Some of the savings will come from technology applications at the base level that will enhance equipment reliability and allow us to eliminate the traditional division of labor between operations and maintenance. Other savings will come from combining or eliminating headquarters and intermediate staff functions, dissolving special communications teams or having operating activities absorb them, and colocating test, integration, and interoperability functions.

Acquisition Professional Development

In constructing the development program for the dedicated acquisition corps, we assured proper use of existing programs, identified needed new programs, increased the emphasis on education and training, and made the career paths compatible for both military and civilian specialists. The career paths have initial, middle, and senior levels, with the requirements for training, length of service, and acquisition experience identified in each path. A new pipeline course of approximately four months is to be part of initial level training for military specialists. Career

paths are provided for rated and non-rated officers in the acquisition corps. The requirement that non-rated acquisition officers have an operational tour and a flow of rated officers into acquisition will infuse user perspective into our program offices and acquisition system.

In the area of education, we recommend continuing DSMC for program management personnel. For DSMC attendees, ISS normally would be accomplished by correspondence. Graduate degrees for acquisition personnel will be emphasized and the Education with Industry Program reviewed for expansion.

Career development for individuals in the acquisition corps will be closely tracked to ensure objectives of the career model are met. We will establish a Professional Development Council to provide policy oversight.

Collateral Tasks

We appreciate the opportunity to participate in the work of the OSD Task Forces, and in the case of the Marsh Task Force, to chair the subgroup on Production, Logistics, and Acquisition. The Secretary felt it would be useful, in addition to the participation of the Air Force representatives, to comment on several of the issues addressed.

Joint OSD-DoD Component DCMA Task Force

The Air Force has supported the Task Force with substantial numbers of skilled contract administration personnel. We support consolidation of Contract Administration. The Air Force will continue to streamline the organizations that DLA will subsume, and we consider the reductions we make to be Air Force DMR savings.

Regulatory Review

The Air Force strongly supports the effort of the DoD Regulatory Task Force to streamline contract clauses and reduce the amount of lower level contracting guidance. Internally, we have found that Air Force acquisition policy outside the procurement area is scattered throughout regulations, policy letters, and pamphlets that are sometimes contradictory, overlapping, or outdated. Each OPR is reviewing the policies in its area of responsibility to consolidate guidance, and where appropriate, eliminate it. The guidance remaining after the review will be forwarded for use in the new DoD acquisition regulation series. Where appropriate, we will pipeline streamlined OSD acquisition regulations to our operating levels.

## Acquisition Management Review

### DAB Streamlining

The DAB process must be restructured to a foundation of accountability, trust, and timely decisions. The primary focus of the DAB, after reducing the number of committees and membership on each, must be on value-added acquisition oversight. We have streamlined our own processes by eliminating the Air Force Board/Air Force Council review prior to the AFSARC. The Acquisition Decision Memorandum preparation/signature procedures must include specific exit criteria for the next milestone and eliminate duplicate cost and supportability reviews.

### Automated Information Systems

The Major Automated Information Systems Review Council (MAISRC) has been integrated with the DAB, and the $25M (one year)/$100M (total) threshold for major AIS retained. We will consolidate the Air Force Automated Information Systems Acquisition Review Council (AISARC) into the AFSARC. To insure each AIS receives management and oversight consistent with its type, application and complexity, the SAE should determine at Milestone I whether the full SAE-PEO-PM management structure should be imposed on AIS which fall below the major AIS thresholds of $25M/$100M.

## Acquisition Policy and Resource Allocation

### Acquisition Reporting Requirements

The procedures for collecting, compiling, formatting, and delivering various acquisition reports are labor intensive, time consuming, and leave little time for analysis. Many contain redundant data and are not useful for decision-making. We need to control the number and content of the reports. We also need to streamline the methods to collect and set common data bases to consolidate, analyze and distribute data. We will also investigate alternatives to incorporate functional-type reports that contain data similar to the SARs into DOD's Consolidated Automated Reporting System (CARS).

## Derived Tasks

We are deriving significant benefits from broadening DMR to apply it throughout the Air Force. The effect on attitudes is perhaps more important than the specific proposals. The DMR is now seen as a tool to promote efficiencies across the spectrum of Air Force activities. Said another way, people all over the Air Force want to work more effectively to get the job done. It is this attitude of constructive pruning of the underbrush, as well as the initiatives themselves, that we are trying to derive from DMR.

Ethics

The Air Force is participating in the DoD Ethics Council and the dialogue on ethics issues with DoD. The need for all personnel to adhere to the highest standards of ethical behavior is a matter stressed at all levels. Ethics is both a command and personal responsibility. In the Secretariat and Air Staff, the General Counsel and Judge Advocate General have programs to provide information and advice on standards of conduct. In the field, commanders are charged with the education and training of both military members and civilian employees. In addition to initial briefings, all persons must be given a reminder about their standards of conduct responsibilities at least annually. Officers and employees separating from the service are counselled on post-employment restrictions, and major commands are encouraged to implement conflict of interest sensitivity programs. In the acquisition commands, because of the potential for conflict and the issue of public trust, standards of conduct is a matter of particular emphasis. AFSC has developed the "Straight Arrow" program, while the program in AFLC is known as PACER TIE (Trust, Integrity and Ethics). Each command's program meets its needs and supports the Air Force-wide policy of fostering the highest ethical and professional standards.

The Future

We have many promising initiatives and suggestions still under review. Additional ideas will be worked into the FY 92 POM process. We believe the potential for additional savings is substantial.

While the Executive Group will need to function as the Air Force's chief DMR entity for some period of time, we will begin to integrate DMR principles into the permanent Air Force structure and decision processes to best assure the continuation of its philosophy.

In the Air Force, DMR is a commitment to excellence in our institution.

II

101ST CONGRESS
2D SESSION

# S. 2440

To amend various provisions of law that affect the operations and management of the Department of Defense, particularly in the areas of military personnel, acquisition reform, civilian personnel management, and for real property.

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IN THE SENATE OF THE UNITED STATES

APRIL 5 (legislative day, JANUARY 23), 1990

Mr. NUNN (for himself and Mr. WARNER) (by request) introduced the following bill; which was read twice and referred to the Committee on Armed Services

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# A BILL

To amend various provisions of law that affect the operations and management of the Department of Defense, particularly in the areas of military personnel, acquisition reform, civilian personnel management, and for real property.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

**SECTION 1. SHORT TITLE.**

This Act may be cited as the "Defense Management Improvement Act".

**SEC. 2. TABLE OF CONTENTS.**

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Sec. 402. Revenue from outleasing of Department of Defense assets.

# TITLE I—MILITARY PERSONNEL

## SEC. 101. AUTHORITY TO TERMINATE SELECTIVE REENLISTMENT BONUS.

(a) Subsection (b) of section 308 of title 37, United States Code, is amended by adding at the end the following new paragraph (3):

"(3) Whenever refund is not required under subsection (d), the Secretary of Defense may provide that bonus installments due to a member who does not complete the term of enlistment for which a bonus was paid under this section or who ceases to perform in the specialty for which a bonus was paid under this section will not be paid. In exercising this authority, the Secretary is authorized to prescribe the circumstances under which bonus installments terminate.".

(b) This amendment shall apply to bonuses paid on or after the effective date of this Act.

## SEC. 102. PERMANENT AUTHORITY TO PAY SELECTIVE REENLISTMENT BONUSES.

Sections 308(g) and 308a(c) of title 37, United States Code, are hereby repealed.

## SEC. 103. VARIANCE IN OFFICER STRENGTH AUTHORIZATIONS.

Subsection (a) of section 521 of title 10, United States Code, is amended by adding at the end "The Secretary of Defense may apply the 0.5-percent increase in end strength

authorized pursuant to section 115(b)(1)(A) of this title in prescribing the total number of officers authorized to serve on active duty, provided that the resulting number of officers authorized to be on active duty at the end of the fiscal year in an armed force is not greater than 100.5 percent of the total number of officers otherwise authorized by the Congress for that armed force for that fiscal year.".

**SEC. 104. ANNUAL MANPOWER END STRENGTHS; REDISTRIBUTION OF MANPOWER AUTHORIZATIONS; APPROPRIATION TRANSFERS.**

(a) Subparagraph (b) of section 115 of title 10, United States Code, is amended in paragraph (1) by—

(1) deleting the second sentence of subparagraph (A);

(2) redesignating subparagraph (D) as (F); and

(3) inserting after subparagraph (C) the following new subparagraphs (D) and (E):

"(D) Upon determination by the Secretary of Defense that such action is in the national interest, end strengths authorized for a component of the armed forces pursuant to paragraph (a)(1) and clauses (b)(1)(A) (i) and (ii) may be distributed among the (i) Selected Reserve (as defined in section 268(b) of this title), (ii) active-duty personnel who are to be paid from funds appropriated for active-duty personnel, and (iii)

active-duty personnel and full time National Guard duty personnel who are paid by funds appropriated for reserve component personnel.

"Upon the exercise of the foregoing authority, in addition to any other transfer authority available to the Department of Defense, appropriations available to the Department of Defense for the pay of such personnel may be transferred in such sums as may be necessary to reflect the distributions made pursuant to the foregoing authority.

"The total end strength shall not exceed the sum of the end strengths authorized pursuant to clauses (i), (ii), and (iii) in the preceding sentence including any increase in end strength made pursuant to subparagraph (E) of this paragraph.

"(E) The end strength authorized pursuant to clause (ii) of subparagraph (D) for a fiscal year may be increased by a number equal to not more than 0.5 percent of the end strength authorized for such component for that fiscal year, and the end strength authorized pursuant to clause (iii) of subparagraph (D) for a fiscal year may be increased by a number equal to not more than 2 percent of the end strength authorized for such component for that fiscal year. Increases may be made under this subparagraph to officer end strength, enlist-

ed end strength, or any combination of officer and enlisted end strength as long as the increases do not exceed the limits established by this clause.".

**SEC. 105. INVOLUNTARY RELEASE OF REGULAR OFFICERS FROM ACTIVE DUTY.**

Subchapter III of chapter 36, title 10, United States Code, is amended as follows: (a) by amending section 630, to include its catchline, to read as follows:

**"§ 630. Discharge or involuntary transfer to reserve component of regular commissioned officers with less than eight years of active commissioned service**

"(a) Upon a determination by the Secretary concerned that such action is necessary to meet the needs of the military department concerned, a regular officer on the active duty list with less than eight years of active commissioned service, but who has remaining obligated service pursuant to section 651 of this title or under regulations prescribed by the Secretary of the military department concerned, may be involuntarily released from active duty and transferred to the Ready Reserve for the remainder of that officer's period of obligated service:

"(1) The officer, if otherwise qualified, shall be tendered an appointment as prescribed in section 595 of this title: *Provided,* That the officer is transferred to

the reserve component in the same grade held in the regular component, subscription to a separate oath of office pursuant to section 591 of this title is not required.

"(2) An officer who declines the tender of a reserve appointment under the circumstances described in this section shall be transferred to the reserve component in an enlisted status pursuant to sections 510(a) and 651(b) of this title, in a grade to be determined by the Secretary of the military department concerned.

"(b) The Secretary of the military department concerned may discharge any regular officer on the active duty list who—

"(1) has less than five years of active commissioned service; or

"(2) is serving in the grade of second lieutenant or ensign and has been found not qualified for promotion to the regular grade of first lieutenant or lieutenant (junior grade).

"(c) The Secretary of the military department concerned shall establish the discharge date for any officer separated pursuant to this authority. For an officer described in paragraph (b)(2), unless the officer has been promoted, this date shall be not later than the eighteen-month period beginning

on the date on which the officer is first found not qualified for promotion.

"(d) The provisions of this section do not apply to an officer separated pursuant to chapter 60 or section 632 of this title.

"(e) The Secretary of Defense shall prescribe regulations for the administration of this section.".

(b) The table of sections at the beginning of subchapter III is amended by amending the item relating to section 630 to read as follows:

"630. Discharge or involuntary transfer to reserve component of regular commissioned officers with less than eight years of active commissioned service.".

**SEC. 106. RANK UPON RETIREMENT.**

(a) Chapter 345 of title 10, United States Code, is amended—

(1) by adding at the end the following new section 3583:

**"§ 3583. Rank retired commissioned officers**

"An officer who is retired in a grade below the highest grade held while on active duty, pursuant to section 1370(a)(2) of this title, may, upon approval of the Secretary of the Army, retain the rank and insignia of grade for the highest grade in which he served on active duty satisfactorily for a period of eighteen months and, for all purposes of law other than computation of retired pay, be considered to have retired in the higher grade."; and

(2) by amending the table of sections at the beginning of such chapter by adding at the end the following:

"3583. Rank: retired commissioned officers.".

(b) Chapter 535 of title 10, United States Code, is amended—

(1) by adding at the end the following new section 5509:

**"§ 5509. Rank: retired commissioned officers**

"An officer who is retired in a grade below the highest grade held while on active duty, pursuant to section 1370(a)(2) of this title, may, upon approval of the Secretary of the Navy, retain the rank and insignia of grade for the highest grade in which he served on active duty satisfactorily for a period of eighteen months and, for all purposes of law other than computation of retired pay, be considered to have retired in the higher grade."; and

(2) by amending the table of sections at the beginning of such chapter by adding at the end the following:

"5509. Rank: retired commissioned officers.".

(c) Chapter 845 of title 10, United States Code, is amended—

(1) by inserting at the end the following new section 8583:

"§ 8583. Rank: retired commissioned officers

"An officer who is retired in a grade below the highest grade held while on active duty, pursuant to section 1370 of this title, may, upon approval of the Secretary of the Air Force, retain the rank and insignia of grade for the highest grade in which he served on active duty satisfactorily for a period of eighteen months and, for all purposes of law other than computation of retired pay, be considered to have retired in the higher grade."; and

(2) by amending the table of chapters at the beginning of such chapter by adding at the end:

"8583. Rank: retired commissioned officers.".

SEC. 107. NAVY LIMITED DUTY OFFICERS; INVOLUNTARY RETIREMENT OF CAPTAINS AND COMMANDERS.

(a)(1) Section 633 of title 10, United States Code, is amended by inserting "or section 6383" after "section 5596(e)," the first time it appears in that section.

(2) Section 634 of title 10, United States Code, is amended by inserting after "each officer of the Regular Navy" "except an officer designated for limited duty to whom section 6383(a)(3) of this title applies".

(b) Section 6383 of title 10, United States Code, is amended—

(1) by redesignating subsection (a) as paragraph (a)(1);

(2) by adding the following new paragraphs:

"(2) Each regular officer of the Navy who is an officer designated for limited duty and who is serving in the grade of commander, who has failed of selection for promotion to the grade of captain for the second time and whose name is not on a list of officers recommended for promotion to the grade of captain shall—

"(A) if he is eligible for retirement as a commissioned officer under any provision of law, be retired under that law on the date requested by him and approved by the Secretary of the Navy, which date shall be not later than the first day of the seventh calendar month beginning after the month in which the President approves the report of the board which considered him for the second time; or

"(B) if he is not eligible for retirement as a commissioned officer, be retired on the date requested by him and approved by the Secretary of the Navy after becoming eligible for retirement as a commissioned officer which date shall be not later than the first day of the seventh calendar month beginning after the month in which he becomes eligible for retirement as a commissioned officer. If not retired earlier, a regular officer of the Navy designated for limited duty who is serving in the grade of commander, and whose name is not on a list of officers recommended for promotion to the

grade of captain shall be retired on the last day of the month following the month in which he completes thirty-five years of active naval service, exclusive of active duty for training in a reserve component.

"(3) Each regular officer of the Navy who is an officer designated for limited duty and who is serving in the grade of captain shall, if not retired sooner, be retired on the last day of the month following the month in which he completes thirty-eight years of active naval service, exclusive of active duty for training in a reserve component."; and

(3) by inserting in the last sentence of subsection (i) after "lieutenant colonel" "or commander, or thirty years active commissioned service for an officer of the Navy if in the grade of captain,".

**SEC. 108. SELECTION AND PROMOTION OF OFFICERS IN THE GRADE OF FIRST LIEUTENANT OR LIEUTENANT (JUNIOR GRADE).**

(a) Section 611 of title 10, United States Code, is amended by redesignating subsection (a) as (a)(1) and by adding at the end the following new paragraph (2):

"(2) Whenever the needs of the service require the number of officers to be recommended for promotion to the grade of captain in the Army, Air Force, or Marine Corps, or lieutenant in the Navy, as determined pursuant to section 622 of this chapter, to be equal to, or greater than the

number of officers eligible to be considered for promotion by a selection board convened under this section, the Secretary of Defense may waive the requirement to convene a selection board and allow those officers who would otherwise be considered by the selection board to be considered under regulations prescribed by the Secretary of the military department concerned.".

(b) Paragraph (a)(1) of section 624 of title 10, United States Code, is amended to read as follows:

"(1) When the report of a selection board convened under section 611(a)(1) of this title is approved by the President, or when a list of officers is approved for promotion pursuant to the waiver authority of the Secretary of Defense, as prescribed in section 611(a)(2) of this title, the Secretary of the military department concerned shall place the names of all officers approved for promotion within a competitive category on a single list for that competitive category, to be known as a promotion list, in the order of the seniority of such officers on the active duty list.".

(c) Section 631 of title 10, United States Code, is amended by adding at the end the following new subsection (c):

"(c) An officer whose name is not placed on a list of officers to be promoted to the grade of captain in the Army, Air Force, or Marine Corps, or lieutenant in the Navy, in

accordance with the waiver authority of the Secretary of Defense, as prescribed in section 611(a)(2) of this title, shall be considered to have failed of selection for promotion.".

SEC. 109. AUTHORIZE TRAVEL AND TRANSPORTATION ALLOWANCES.

Section 408 of title 37, United States Code, relating to travel and transportation allowances for travel within the limits of the duty station, is amended—

(1) by inserting "(a)" before "A member of a uniformed service"; and

(2) by adding at the end the following new subsection (b):

"(b) Under regulations prescribed by the Secretaries concerned, a member of a uniformed service, directed by competent authority to perform duty at a location within the limits of his duty station, other than his residence or normal duty location, for a period of time that requires the member to utilize overnight accommodations, is entitled to the travel and transportation allowances authorized by section 404 of this title.".

SEC. 110. REMOVAL ON FIXED LIMITS ON SENIOR ENLISTED GRADE STRENGTH.

Section 517 of title 10, United States Code, is repealed, and the corresponding item in the table of sections at the beginning of chapter 31 is deleted.

## TITLE II—ACQUISITION

### SEC. 201. MULTIYEAR CONTRACTING ENHANCEMENT.

(a) AUTHORITY FOR USE OF MULTIYEAR CONTRACTS.—Subsection (h) of section 2306 of title 10, United States Code, is amended—

(1) by striking out "To" in paragraph (1) and inserting in lieu thereof "Subject to paragraph (6) and to";

(2) by striking out in paragraph (1) "(other than contracts described in paragraph (6))";

(3) by striking out in subparagraph (1)(A) "reduced total costs under the contract" and inserting in lieu thereof "substantial savings of the total anticipated costs of carrying out the program through annual contracts";

(4) by inserting before the period in paragraph (6) ", unless the Secretary of Defense finds with respect to such a contract that application of this subsection is in the national interest"; and

(5) by striking out paragraphs (9) and (11) and by redesignating paragraph (10) as paragraph (9).

(b) LIMITATIONS ON MULTIYEAR CONTRACTING.—Section 9021 of the Department of Defense Appropriations Act for Fiscal Year 1990 (Public Law 101–165; 103 Stat.

1133) is repealed except for the last sentence authorizing the acquisition of certain programs on a multiyear basis.

SEC. 202. COMMERCIAL STYLE ACQUISITION PRACTICES.

(a) This section may be cited as the "Commercial Products Acquisition Act of 1990".

(b) The Congress finds that the economy, efficiency, and effectiveness of product acquisition by the executive agencies would be improved if they purchased off-the-shelf products available in the commercial market whenever such products will satisfy agency requirements. Many of the specifications and other requirements in Government solicitations and contracts are unique and serve no commercial purpose. These specifications and requirements result in additional costs to the seller of the products as well as the agency buying them. As a result, many sellers of commercial products do not compete for Government contracts, and the Government is unable to take advantage of the vigorous competition, large economies of scale, short delivery times, market-driven efficiency and innovation, and high-value products that are available in the commercial market.

(c) The purpose of this provision of the Defense Management Improvement Act is to require the development of commercial-style purchasing procedures to be used by executive agencies to better utilize market research, avoid overspe-

cification and otherwise facilitate the acquisition of commercial products.

(d)(1) The Administrator of the Office of Federal Procurement Policy, jointly with the Administrator of the General Services Administration, the Secretary of Defense, and the Administrator of the National Aeronautics and Space Administration, shall develop regulations that set forth commercial-style procedures for the acquisition of commercial products. These regulations shall be incorporated into the Federal Acquisition Regulation. Consistent with the authority of the Administrator of General Services under section 111 of the Federal Property and Administrative Procedures Act of 1949, the Administrator shall prescribe such additional regulations as may be necessary to implement this section as it relates to automated data processing equipment. To ensure consistency with the objectives of this section, any unreconciled implementation issues may be referred to the Office of Management and Budget for resolution pursuant to section 111 of the Federal Property and Administrative Procedures Act of 1949. For the purpose of this section, commercial products are products that are—

(A) competitively available and sold in significant quantities in the commercial market; and

(B) required in the same form as they are available in the commercial market or with only minor

modification that does not alter their essential performance or functional characteristics. Contracts for commercial products may include those incidental services that are normally provided with sales of such products in the commercial market.

(2) The regulations issued under subsection (d)(1) shall—

(A) require procurements conducted under this section to be advertised by a public notice in the Commerce Business Daily. The notice shall include—

(i) a product description;

(ii) in a case where the agency expects to issue a series of solicitations under one notice, the time period during which solicitations are expected to be issued;

(iii) at the discretion of the contracting officer, a brief summary of the performance or functional requirements, tests, essential physical characteristics, or other requirements that will be used to ensure that offered products are suitable for the agency's use or any other criteria which the contracting officer determines are appropriate;

(iv) a reference to Federal Information Processing Standards required for agency use under section 111(d) of the Federal Property and Ad-

ministrative Services Act of 1949 (40 U.S.C. 759(d)), so as to ensure interoperability or compatibility; and

(v) the name, business address, and telephone number of the official to whom any submissions required by the notice are to be made and from whom solicitations issued under the notice may be obtained;

(B) authorize the contracting officer to require offerors to demonstrate, in accordance with criteria prescribed by the contracting officer, that products being offered have achieved a level of market acceptance necessary to indicate that the products are suitable for the agency's use or that the processes used to manufacture the products meet established commercial or other specified standards; and when such criteria are specified, prohibit the award of a contract to any offeror who has not made the required demonstration to the satisfaction of the contracting officer;

(C) authorize the contracting officer to include in the public notice a provision that waives the requirement that a product be sold in significant quantities in the commercial market in order to quality as a commercial product, provided that the product—

(i) has been satisfactorily supplied under current or recent contracts for the same requirements;

(ii) otherwise meets the product description, specifications, and other criteria prescribed by the public notice and solicitation; and

(iii) is evaluated on an equal basis with the commercial products offered;

(D) authorize the contracting officer, after publication of the public notice, to take one or a combination of the following actions—

(i) issue solicitations;

(ii) review the responses to the notice and then—

(I) issue solicitations;

(II) adopt additional specifications or other criteria and issue solicitations prescribing those specifications or other criteria; or

(III) establish a list of sources that will be issued a series of solicitations during the period of time specified by the notice; or

(iii) determine that suitable commercial products are not available and cancel the notice;

(E) except as provided for in subparagraph (F), require solicitations that are issued under subparagraph

(D)(ii) or synopses of such solicitations to be issued to all sources that—

(i) make the submission required by the public notice either within the time period specified by the notice; or sufficiently in advance of the issuance of a solicitation, as specified in the notice, to ensure the submission can be adequately evaluated before a solicitation is issued; and

(ii) are not notified that their submission is not responsive to the notice or that they are not responsible sources;

(F) authorize the contracting officer, in issuing solicitations to sources on a list established under clause (D)(ii)(III), to rotate among such sources whenever the number qualifying for inclusion on the list is extensive;

(G) require the contracting officer to reject an offer that—

(i) is submitted in response to a solicitation issued under subparagraph (D)(ii) by a source that is not required to be issued a solicitation under paragraph (E);

(ii) is not submitted within the time period specified in the solicitation for the submission of offers;

(iii) is not responsive to the solicitation; or

(iv) is submitted by a source that is determined not to be a responsible source;

(H) require the contracting officer, in establishing deadlines for submissions required by the public notice and for offers, to ensure that interested sources have a reasonable opportunity, consistent with the needs of the agency, to participate in the competition;

(I) require the evaluation of offers and selection for contract award to be based solely on the factors specified in the solicitation. Such factors shall include price and any other factors which the contracting officer determines are necessary to identify the offer that provides the greatest benefit to the agency. The past performance of products and sources may be among those factors;

(J) authorize the award of a contract without discussions or a request for best and final offers;

(K) require prompt publication in the Commerce Business Daily of a notice announcing the award of a contract to a source on a list established under subparagraph (D)(ii)(III); and

(L) require the use of commercial-style contract terms and conditions to the maximum extent consistent with the interests of the Government.

(3) The provisions in this subsection governing the publication of public notices announcing procurements, the issuance of solicitations, the time periods for submitting offers, or otherwise the procedures for conducting procurement shall apply to procurements conducted under this subsection in lieu of such requirements in other provisions of law; and to the extent any other provisions in this subsection are inconsistent with any other provision of law, the provisions in this section shall govern the conduct of procurements under this section. However, this section shall not be implemented in a manner that would violate any United States obligation under the Agreement on Government Procurement negotiated pursuant to the General Agreement on Tariffs and Trade.

(e)(1) Title III of the Federal Property and Administrative Services Act of 1949 is amended by adding at the end thereof the following:

"ACQUISITION OF COMMERCIAL PRODUCTS

"SEC. 311. (a) The contracting officer shall use commercial-style procedures to procure commercial products unless the contracting officer purchases them under simplified small purchase or multiple award schedule procedures or determines and documents that another authorized method of acquisition is more appropriate.

"(b) For the purposes of this section:

"(1) 'Commercial products' are products that are—

"(A) competitively available and sold in significant quantities in the commercial market; and

"(B) required in the same form as they are available in the commercial market or with only minor modification that does not alter their essential performance or functional characteristics. Contracts for commercial products may include those incidental services that are normally provided with sales of such products in the commercial market.

"(2) 'Commercial-style procedures' are those prescribed in the regulations issued pursuant to subsection (d) of the Commercial Products Acquisition Act of 1990.

"(c) Purchases of commercial products made pursuant to the commercial-style procedures required by this section or simplified small purchase or multiple award schedule procedures shall be exempt, except as provided in subsection (e), from any other requirement of law that—

"(1) prescribes terms and conditions to be included in contracts,

"(2) prescribes preferences to be given to any source or class of sources or mandates a particular source or class of sources, or

"(3) prescribes requirements to be imposed on the contractor that relate to the contractor's performance of the contract,

and which requirements of law are not equally applicable to contracts to which the United States Government is not a party.

"(d) This section shall apply to the acquisition of automatic data processing equipment. However, nothing in this section is intended to impair the authority of the Administrator of General Services as conferred by section 111 of the Federal Property and Administrative Services Act of 1949.

"(e) This section does not authorize—

"(1) any exemption from the provisions of law requiring Federal agencies to purchase certain listed products from—

"(A) qualified workshops for the blind and other severely handicapped in accordance with the Javits-Wagner-O'Day Act (41 U.S.C. 46–48c); or

"(B) prison industries in accordance with sections 4121 through 4129 of title 10, United States Code;

"(2) any exemption from the following provisions of law related to the employment of labor to manufacture products for delivery under Government contracts—

"(A) the nondiscrimination and affirmative action requirements of the program for the employment of qualified handicapped persons under section 503 of the Rehabilitation Act of 1973 (29 U.S.C. 793);

"(B) the nondiscrimination and affirmative action requirements of the program for qualified disabled veterans under section 503(a) of the Vietnam Era Veterans' Readjustment Assistance Act of 1974 (38 U.S.C. 2012);

"(C) the non-discrimination and affirmative action requirements of the program to implement Executive Order 11246; or

"(D) the labor standards applicable under the Walsh-Healey Act (41 U.S.C. 35–45); or

"(3) any exemption from the requirements of section 304(d) of this title or any policies or procedures established by the Administrator with respect to the negotiation and award of Multiple Award Schedule Contracts.".

(2) The table of contents of such Act is amended by adding at the end of title III the following new section:

"Sec. 311. Acquisition of Commercial Products.".

(f)(1) Chapter 137 of title 10, United States Code, is amended by adding at the end the following new section:

**"§ 2331. Acquisition of commercial products**

"(a) The contracting officer shall use commercial-style procedures to procure commercial products unless the contracting officer purchases them under simplified small purchase or multiple award schedule procedures or determines and documents that another authorized method of acquisition is more appropriate.

"(b) For the purposes of this section:

"(1) 'Commercial products' are products that are—

"(A) competitively available and sold in significant quantities in the commercial market; and

"(B) required in the same form as they are available in the commercial market or with only minor modification that does not alter their essential performance or functional characteristics. Contracts for commercial products may include those incidental services that are normally provided with sales of such products in the commercial market.

"(2) 'Commercial-style procedures' are those prescribed in the regulations issued pursuant to subsection (d) of the Commercial Products Acquisition Act of 1990.

"(c) Purchases of commercial products made pursuant to the commercial-style procedures required by this section or

simplified small purchase or multiple award schedule procedures shall be exempt, except as provided in subsection (e), from any other requirement of law that—

"(1) prescribes terms and conditions to be included in contracts,

"(2) prescribes preferences to be given to any source or class of sources or mandates a particular source or class of sources, or

"(3) prescribes requirements to be imposed on the contractor that relate to the contractor's performance of the contract,

and which requirements of law are not equally applicable to contracts to which the United States Government is not a party.

"(d) This section shall apply to the acquisition of automatic data processing equipment. However, nothing in this section is intended to impair the authority of the Administrator of General Services as conferred by section 111 of the Federal Property and Administrative Services Act of 1949.

"(e) This section does not authorize—

"(1) any exemption from the provisions of law requiring Federal agencies to purchase certain listed products from—

"(A) qualified workshops for the blind and other severely handicapped in accordance with the Javits-Wagner-O'Day Act (41 U.S.C. 46–48c); or

"(B) prison industries in accordance with sections 4121 through 4129 of this title; or

"(2) any exemption from the following provisions of law related to the employment of labor to manufacture products for delivery under government contracts—

"(A) the nondiscrimination and affirmative action requirements of the program for the employment of qualified handicapped persons under section 503(a) of the Rehabilitation Act of 1973 (29 U.S.C. 793(a));

"(B) the nondiscrimination and affirmative action requirements of the program for qualified disabled veterans under section 503(a) of the Vietnam Era Veterans' Readjustment Assistance Act of 1974 (38 U.S.C. 2012(a));

"(C) the nondiscrimination and affirmative action requirements of the program to implement Executive Order 11246; or

"(D) the labor standards applicable under the Walsh-Healey Act (41 U.S.C. 35–45).".

(2) The table of contents at the beginning of such chapter is amended by adding at the end the following new item:

"2331. Acquisition of commercial products.".

(g) INTRA-AGENCY PROTEST PROCESS.—The Secretary of Defense may authorize selected components of the Department of Defense, for a period of three years beginning ninety days after the regulations required by subsection (d) are incorporated into the Federal Acquisition Regulation, to conduct a pilot program to test the following procedures for resolving protests of actions taken in conducting procurements pursuant to such regulations:

(1) An interested party may file with the head of an agency a written protest concerning an alleged violation of a statute or regulation relating to the award or proposed award of a contract made pursuant to this section in accordance with procedures promulgated by the Secretary of Defense. Such protest shall be the sole administrative remedy available to an interested party. The procedures authorized by this subsection shall, at a minimum, provide for—

(A) an impartial review by an official designated by the head of the agency of all protests that are filed by an interested party within ten working days of the date on which the basis of the protest was known or should have been known;

(B) the stay of the award of the contract pending resolution of the protest, unless the head of the agency determines in writing that the equipment or supplies to be contracted for are urgently required and delivery or performance will be unduly delayed by failure to promptly make award or that other compelling considerations make necessary the prompt award of the contract;

(C) a written decision within thirty working days of the filing of the protest, unless the official designated for deciding protests determines and states in writing the reasons that the specific circumstances require a longer period for resolution for the protest and award of the contract has been stayed; and

(D) designation of the official to decide protests at a level not lower than a general or flag officer if a member of the armed forces or if a civilian is serving in position with a grade under the General Schedule (or any other schedule for civilian officers or employees) that is comparable to the grade of brigadier general or rear admiral (lower half).

(2) For purposes of subsection (f), purchases of commercial products under this Act shall be exempt

from any Federal statute conferring jurisdiction on any governmental entity, other than United States Federal courts, for the resolution of protests that is inconsistent with this subsection, including sections 3551 through 3556 of title 31 and section 111(h) of the Federal Property and Administrative Services Act of 1949 (40 U.S.C. 759(h)).

(3) For purposes of this subsection:

(A) "Protest" means a written objection by an interested party to the prequalification of commercial products, or to a solicitation for bids or proposal for a proposed contract for the procurement of commercial products or a written objection by an interested party to a proposed award or to the award of such a contract.

(B) "Interested party" means an actual or prospective bidder or offeror whose direct economic interest would be affected by the award of the contract or by failure to award the contract for commercial products procured under the authority of this section.

(h) EFFECTIVE DATES.—The regulations required by subsection (d) shall be issued two hundred and seventy days after the date of enactment of this Act. Subsections (e), (f), and (g) shall become effective ninety days after the regula-

tions required by subsection (d) are incorporated into the Federal Acquisition Regulation.

**SEC. 203. RECISION OF COMMERCIAL PRICING CERTIFICATION REQUIREMENT.**

Section 2323 of title 10, United States Code, is hereby repealed.

**SEC. 204. AWARDS WITHOUT DISCUSSIONS.**

Section 2305(b)(4)(A)(ii) of title 10, United States Code, is amended adding at the end ", or the greatest benefit to the United States considering factors such as price, quantity, design, performance, management capability, technical capability, delivery, or risk as stated in the solicitation in accordance with paragraphs (a) (2) and (3),".

**SEC. 205. PROCUREMENT SIMPLIFICATION—UNIFORM THRESHOLD FOR VARIOUS SOCIOECONOMIC REQUIREMENTS.**

(a) Section 2304 of title 10, United States Code, is amended by adding at the end of subsection (g) the following new subparagraph (5):

"(5) The following provisions of the Small Business Act (15 U.S.C. 631–650) shall not apply to a small purchase as defined in section 2304(g)(2) of this title:

"(A) The last sentence of section 8(b)(7)(A) (15 U.S.C. 637(b)(7)(A)); and

"(B) Section 8(b)(7)(C) (15 U.S.C. 637(b)(7)(C)).".

(b) Section 303 of the Federal Property and Administrative Services Act of 1949 (41 U.S.C. 253) is amended by adding at the end of subsection (g) the following new paragraph (5):

"(5) The following provisions of the Small Business Act (15 U.S.C. 631–650) shall not apply to a small purchase as defined in section 303(g)(2) of this Act:

"(A) The last sentence of section 8(b)(7)(A) (15 U.S.C. 637(b)(7)(A)); and

"(B) Section 8(b)(7)(C) (15 U.S.C. 637(b)(7)(C)).".

(c) Sections 8 and 15 of the Small Business Act (15 U.S.C. 637 and 644) are amended as follows:

(1) In section 8(d)(2)(A) (15 U.S.C. 637(d)(2)(A)) and sections 8(e)(1)(A) (i) and (ii) (15 U.S.C. 637(e)(1)(A) (i) and (ii)) by striking out "$10,000", "$25,000", and "25,000", respectively, and inserting in lieu thereof in each instance "the small purchase threshold as established in section 2304(g)(2) of title 10, United States Code, in the case of agencies listed in section 2303 of title 10, United States Code, or the small purchase threshold as established in section 303(g)(2) of the Federal Property and Administrative Services Act of 1949 (41 U.S.C. 253(g)(2)) in the case

of an executive agency other than those listed in section 2303 of title 10, United States Code".

(2) By striking out section 8(e)(1)(A)(iii).

(3) In sections 8(e)(1)(B) (i) and (ii) (15 U.S.C. 637(e)(1)(B) (i) and (ii)), by striking out "$25,000;" and inserting in lieu thereof "the small purchase threshold as established in section 2304(g)(2) of title 10, United States Code, in the case of agencies listed in section 2303 of title 10, United States Code, or the small purchase threshold as established in section 303(g)(2) of the Federal Property and Administrative Services Act of 1949 (41 U.S.C. 253(g)(2)) in the case of an agency other than those listed in section 2303 of title 10 United States Code" in lieu thereof.

(4) In section 8(e)(1)(C) (15 U.S.C. 637(e)(1)(C)), (A) by striking out "$25,000," each place it appears and inserting in lieu thereof "the small purchase threshold as established in section 2304(g)(2) of title 10, United States Code, in the case of agencies listed in section 2303 of title 10, United States Code, or the small purchase threshold as established in section 303(g)(2) of the Federal Property and Administrative Services Act of 1949 (41 U.S.C. 253(g)(2)) in the case of an agency other than those listed in section 2303 of title 10, United States Code".

(5) In section 15(j) (15 U.S.C. 644(j)), by striking out "$25,000" and inserting in lieu thereof "the small purchase threshold as established in section 2304(g)(2) of title 10, United States Code, in the case of agencies listed in section 2303 of title 10, United States Code, or the small purchase threshold as established in section 303(g)(2) of the Federal Property and Administrative Services Act of 1949 (41 U.S.C. 253(g)(2)) in the case of an agency other than those listed in section 2303 of title 10, United States Code,".

(d) Section 18 of the Office of Federal Procurement Policy Act (41 U.S.C. 16) is amended as follows:

(1) In sections 18(a)(1)(A)(i) and 18(a)(1)(A)(ii), by deleting "$25,000" and inserting in lieu thereof "the small purchase threshold as established in section 2304(g)(2) of title 10, United States Code, in the case of agencies listed in section 2303 of title 10, United States Code, or the small purchase threshold as established in section 303(g)(2) of the Federal Property and Administrative Services Act of 1949 (41 U.S.C. 253(g)(2)) in the case of an agency other than those listed in section 2303 of title 10, United States Code,".

(2) By deleting section 18(a)(1)(A)(iii) in its entirety.

(3) In sections 18(a)(1)(B)(i), and 18(a)(1)(B)(ii), and 18(a)(1)(C) by deleting "$25,000" and inserting in lieu thereof "the small purchase threshold as established in section 2304(g)(2) of title 10, United States Code, in the case of agencies listed in section 2303 of title 10, United States Code, or the small purchase threshold as established in section 303(g)(2) of the Federal Property and Administrative Services Act of 1949 (41 U.S.C. 253(g)(2)) in the case of an agency other than those listed in section 2303 of title 10, United States Code,".

(e) Section 503(a) of the Rehabilitation Act of 1973 (29 U.S.C. 793(a)) is amended by striking out "$2,500" each place it appears and inserting in lieu thereof "the small purchase threshold as established in section 2304(g)(2) of title 10, United States Code, in the case of agencies listed in section 2303 of title 10, United States Code, or the small purchase threshold as established in section 303(g)(2) of the Federal Property and Administrative Services Act of 1949 (41 U.S.C. 253(g)(2)) in the case of an agency other than those listed in section 2303 of title 10, United States Code,".

(f) Section 503(a) of the Vietnam Veterans' Readjustment Assistance Act of 1972 (38 U.S.C. 2012(a)) is amended by striking out "the amount of $10,000 or more" and inserting in lieu thereof "excess of the small purchase threshold as

established in section 2304(g)(2) of title 10, United States Code, in the case of agencies listed in section 2303 of title 10, United States Code, or the small purchase threshold as established in section 303(g)(2) of the Federal Property and Administrative Services Act of 1949 (41 U.S.C. 253(g)(2)) in the case of an agency other than those listed in section 2303 of title 10, United States Code,".

(g) Section 1 of the Act approved June 30, 1936 (commonly referred to as the "Walsh-Healey Act") (41 U.S.C. 35) is amended by striking out "$10,000," in the first sentence and inserting in lieu thereof "the small purchase threshold as established in section 2304(g)(2) of title 10, United States Code, in the case of agencies listed in section 2303 of title 10, United States Code, or the small purchase threshold as established in section 303(g)(2) of the Federal Property and Administrative Services Act of 1949 (41 U.S.C. 253(g)(2) in the case of an agency other than those listed in section 2303 of title 10, United States Code,".

(h) Section 2 of the Service Contract Act of 1965 (41 U.S.C. 351(a)) is amended by striking out "$2,500" and inserting in lieu thereof "the small purchase threshold as established in section 2304(g)(2) of title 10, United States Code, in the case of agencies listed in section 2303 of title 10, United States Code, or the small purchase threshold as established in section 303(g)(2) of the Federal Property and Administra-

tive Services Act of 1949 (41 U.S.C. 253(g)(2) in the case of an agency other than those listed in section 2303 of title 10, United States Code,".

(i) Section 6002(a) of the Solid Waste Disposal Act of 1976 (42 U.S.C. 6962(a)) is amended by striking out "$10,000" the first time it appears and "$10,000 or more" and inserting in lieu thereof in each instance "the small purchase threshold as established in section 2304(g)(2) of title 10, United States Code, in the case of agencies listed in section 2303 of title 10, United States Code, or the small purchase threshold as established in section 303(g)(2) of the Federal Property and Administrative Services Act of 1949 (41 U.S.C. 253(g)(2)) in the case of an agency other than those listed in section 2303 of title 10, United States Code,".

SEC. 206. FEDERAL ACQUISITION REGULATORY COUNCIL MEMBERSHIP.

Section 25 of the Office of Federal Procurement Policy Act (41 U.S.C. 421) as amended by Public Law 100–679 is further amended by striking out subparagraph (b)(2) and inserting in lieu thereof the following new subparagraph (b)(2):

"(b)(2) Notwithstanding section 205(d) of the Federal Property and Administrative Services Act of 1949, the officials specified in subparagraphs (A), (B), and (C) of paragraph (1) may designate to serve on and attend meetings of the Council in place of that official—

"(A) the official assigned by statute with the responsibility for acquisition policy in each of their respective agencies with authority in the case of the Department of Defense to further redesignate an official at an organizational level not lower than an Assistant Secretary of Defense within the Office of the Under Secretary of Defense for Acquisition; or

"(B) if no official of such agency is assigned by statute with the responsibility for acquisition policy for that agency, the official designated pursuant to section 16(3) of this Act. Further redesignation may not be made.".

SEC. 207. COMPETITIVE ALTERNATIVE SOURCE REQUIREMENT.

Section 2438 of title 10, United States Code, is amended to read as follows:

"(a)(1) Prior to the completion of full-scale development under a major program the Secretary of Defense shall prepare an acquisition strategy for the program.

"(2) The Secretary shall ensure that contracts for each major program are awarded in accordance with the acquisition strategy for such program.

"(b)(1) The acquisition strategy prepared under subsection (a)(1) shall provide that there will be competitive alternative production sources available for major programs and for

major subsystems under the major program when the establishment and maintenance of two or more production sources—

"(A) would likely result in reduced costs for such program;

"(B) would not result in unacceptable delays in fulfilling the needs of the Department of Defense; and

"(C) is otherwise in the national security interests of the United States.

"(2) In carrying out this subsection, the Secretary may provide that the requirement for competitive alternative production sources of a major program or subsystem is satisfied even though the sources for that major program or subsystem do not develop or produce indentical systems if the systems developed serve similar functions and compete effectively with each other.

"(c) In this section:

"(1) 'Major program', means a major defense acquisition program, as such term is defined in section 2430 of this title.

"(2) 'Major subsystem', with respect to a major program, means a subsystem of the system developed under the program, that is purchased directly by the United States and for which—

"(A) the amount for research, development, test and evaluation is 10 percent or more of the amount specified in section 2430(2) of this title as the research, development, test and evaluation funding criterion for identification of a major defense acquisition program; or

"(B) the amount for production is 10 percent or more of the amount specified in section 2430(2) of this title as the production funding criterion for identification of a major defense acquisition program.".

SEC. 208. CERTIFIED COST OR PRICING DATA THRESHOLD.

Subsection (a) of section 2306 of title 10, United States Code, is amended by striking out "$100,000" each place it appears and by inserting in lieu thereof "$500,000".

SEC. 209. SOLICITATION AREA POLICY FOR WEST COAST NAVAL RESERVE FORCE SHIPS.

Subsection (d) of section 7299a of title 10, United States Code, is amended in paragraph (3) by striking out "apply—(A) in the case of voyage repairs; or (B) in the case of a vessel that is assigned to the Naval Reserve Force and homeported on the West Coast of the United States" and inserting in lieu thereof "apply in the case of voyage repairs".

**SEC. 210. AUTHORITY TO AWARD CONTRACTS WHEN COMPETITION EXISTS BETWEEN PUBLIC AND PRIVATE SHIPYARDS.**

Section 7313 of title 10, United States Code (Overhaul of naval vessels: competition between public and private shipyards) is hereby repealed and the corresponding item in the chapter analysis for chapter 633 is hereby deleted.

**SEC. 211. AUTHORITY FOR NAVY TO CONSIDER COSTS FOR WORK OUTSIDE HOME PORT WHEN EVALUATING BIDS.**

Section 9053 of the Department of Defense Appropriations Act, 1990 (Public Law 101–165; 103 Stat. 1140) is hereby repealed.

**SEC. 212. REMOVAL OF RESTRICTION ON CONTRACTING OUT CORE LOGISTICS.**

Section 2464 of title 10, United States Code, is hereby repealed and the corresponding item in the chapter analysis for chapter 146 is hereby deleted.

**SEC. 213. ELIMINATION OF PROHIBITIONS ON CERTAIN ACTIVITIES.**

Sections 2465 and 2466 of title 10, United States Code, are hereby repealed and the corresponding items in the chapter analysis for chapter 146 are hereby deleted.

**SEC. 214. EXCEPTION TO COST PROHIBITION FOR CERTAIN OVERSEA SEVERANCE PAY.**

(a) Subparagraph 2324(e)(1)(M) of title 10, United States Code, is amended by adding the following proviso at the end: ": *Provided, however,* That, under such regulations as are prescribed by the Secretary of Defense, any severance pay paid to foreign nationals in order to comply with the laws of the local host nation may be allowable".

(b) The foregoing proviso to subparagraph 2324(e)(1)(M) shall apply with respect to all costs incurred by contractors after the date of enactment of this Act under covered contracts.

**SEC. 215. AUTHORITY GOVERNING OPERATION OF WORKING-CAPITAL-FUNDED ACTIVITIES.**

Paragraphs (1) and (2) of section 2208(i) of title 10, United States Code, are amended to read as follows:

"(i)(1) Regulations under subsection (h) may authorize an article manufactured by a working-capital-funded Department of the Army arsenal (or other Army industrial facility) that manufactures large caliber cannons, gun mounts, recoil mechanisms, ammunition, munitions, or components thereof to be sold to a person outside the Department of Defense if—

"(A) the article is sold to a United States manufacturer, assembler, developer, or other concern—

(i) for use in developing new products;

(ii) for incorporation into items to be sold to, or to be used in a contract with, an agency of the United States;

(iii) for incorporation into items to be sold to, or to be used in a contract with, or for purposes of soliciting a contract with a friendly foreign government; or

(iv) for use in commercial expendable launch vehicles;

"(B) the purchaser is determined by the Department of Defense to be qualified to carry out the proposed work involving the article to be purchased;

"(C) the article is not readily available from a commercial source in the United States; and

"(D) the sale is to be made on a basis that does not interfere with performance of work by the arsenal for the Department of Defense or for a contractor of the Department of Defense.

"(2) Services related to an article sold, or authorized to be sold, under this subsection (i), may also be sold to the purchaser if the services are to be performed in the United States for the purchaser.".

**SEC. 216. AUTHORIZATION OF PRINTING FOR TECHNICAL DATA.**

Technical data to be delivered under Department of Defense contracts shall not be subject to any law that imposes restrictions on the procurement from commercial sources of any printing, binding, or blank-book work.

**SEC. 217. PILOT PROGRAM FOR MAJOR DEFENSE ACQUISITION PROGRAMS.**

(a) Chapter 137 of title 10, United States Code, is amended by adding at the end the following new section 2332 (after section 2331 added by section 302 of this Act):

**"§ 2332. Pilot program for major defense acquisition programs**

"(a) IN GENERAL.—The Secretary of Defense is authorized, subject to subparagraph (d), to conduct a pilot program in accordance with standard commercial, industrial practices with the objective of identifying the potential for increasing the efficiency and effectiveness of the acquisition process. The Secretary may waive for purposes of such pilot program any provision of law or regulation that the Secretary is not otherwise authorized to waive that—

"(1) prescribes procedures for the procurement of supplies or services;

"(2) prescribes preference to be given to any source or class of sources or mandates a particular source or class of sources;

"(3) prescribes requirements to be imposed on the contractor that relate to the contractor's performance of the contract;

"(4) prescribes requirements governing cost allowability, cost accounting, or auditing, except a provision intended to assure financial integrity for the conduct of government programs and except a provision relating to the authority of the Inspector General of the Department of Defense;

and which law is not equally applicable to contracts to which the United States Government is not a party; or

"(5) prescribes requirements for the management, testing, evaluation of, or reporting on, a program.

"(b) DESIGNATION OF PARTICIPATING PROGRAMS.—The Secretary of Defense may designate no more than six major defense acquisition programs, as defined in section 2430 of title 10, United States Code, to participate in the pilot program.

"(c) REGULATIONS.—The Secretary of Defense shall promulgate regulations to implement the pilot program within two hundred and seventy days after the date of enactment of this section.

"(d) NOTIFICATION.—Whenever the Secretary of Defense determines that a major defense acquisition program should be designated as part of the pilot program under this

provision, the Secretary shall notify the Congress of his intention to designate such program for inclusion in the pilot program.".

(b) The table of sections for such chapter 137 is amended by adding after the item relating to section 2331 (as added by section 202 of this Act) the following:

"2332. Pilot program for major defense acquisition programs.".

SEC. 218. DAVIS-BACON REFORM.

(a) REFERENCE.—Whenever in this section (other than in section 10) an amendment is expressed in terms of an amendment to a section or other provision, the reference shall be considered to be made to a section or other provision of the Act of March 3, 1931 (commonly referred to as the "Davis-Bacon Act").

(b) INCREASE IN THRESHOLD AMOUNT.—Subsection (a) of the first section (40 U.S.C. 276a)) is amended by striking out "$2,000" and inserting in lieu thereof "$250,000".

(c) APPROPRIATE CIVIL SUBDIVISION FOR COMPUTATION OF PREVAILING WAGE.—Subsection (a) of the first section is further amended by striking out "the city, town, village, or other civil subdivision of the State, in which the work is to be performed," and inserting in lieu thereof "the particular urban or rural subsivision (of the State) in which the work is to be performed,".

(d) DETERMINATION OF PREVAILING WAGE.—Subsection (a) of the first section is further amended by adding at

the end thereof the following: "In determining the prevailing wage for a class of laborers, mechanics, or helpers where more than a single wage is being paid to the corresponding class of laborers, mechanics, or helpers, the Secretary shall establish as the prevailing wage—

"(1) the wage paid to 50 percent or more of the corresponding class of laborers, mechanics, or helpers employed on private industry projects of a character similar to the contract work in the urban or rural subdivision of the State in which the work is to be performed, or in the District of Columbia if the work is to be performed there, or

"(2) if the same wage is not paid to 50 percent or more of the laborers, mechanics, or helpers in the corresponding class, the weighted average of the wages paid to the corresponding class of laborers, mechanics, or helpers employed on private industry projects of a character similar to the contract work in the urban or rural subdivision of the State in which the work is to be performed, or in the District of Columbia, if the work is to be performed there.".

(e) EXCLUSION OF FEDERAL PROJECTS FROM PREVAILING WAGE COMPUTATION.—Subsection (b)(1) of the first section is amended by inserting before the semicolon the following: ", excluding the basic hourly rates of pay of indi-

viduals whose wages are established pursuant to the requirements of this Act, unless it is determined that there is insufficient wage data to determine the prevailing wages in the absence of data from Federal or federally assisted projects; data from Federal or federally assisted projects may be used in compiling wage rate data for heavy and highway wage determinations".

(f) CLASSIFICATION OF HELPERS.—The first section is further amended by adding at the end thereof the following new subsection:

"(c)(1) For the purpose of this Act, helpers of a class of laborers or mechanics shall be considered as a separate class and prevailing wages for such helpers shall be determined on the basis of the corresponding class of helpers.

"(2) For the purposes of this section, the term 'helper' means a semiskilled worker (rather than a skilled journeyman mechanic) who—

"(A) works under the direction of and assists a journeyman;

"(B) under the direction and supervision of the journeyman, performs a variety of duties to assist the journeyman, such as—

"(i) preparing, carrying, and furnishing materials, tools, equipment, and supplies and maintaining them in order,

"(ii) cleaning and preparing work areas,

"(iii) lifting, positioning, and holding materials or tools, and

"(iv) other related semiskilled tasks as directed by the journeyman; and

"(C) may use tools of the trade which are under the direction and supervision of the journeyman.".

(g) PROHIBITION ON CONTRACT-SPLITTING.—The first section of the Davis-Bacon Act (as amended by subsection (f) of this section) is further amended by adding at the end thereof the following new subsections:

"(d) Any person entering into a contract under which wages are to be determined in accordance with this Act shall not divide any project into contracts of $250,000 or less if the project would not have been so divided but for the purpose of avoiding application of this Act.

"(e) Whenever the Secretary of Labor determines that a division for such a purpose has occurred, the Secretary may (1) require that the contracts, grants, or other instruments providing Federal financing or assistance be amended so as to incorporate retroactively all the provisions which would have been required under this Act or other applicable prevailing wage statute, and (2) require the contracting or assisting agency, the recipient of Federal financing or assistance, or any other entity which awarded the contract or instrument

providing Federal financing or assistance in violation of this section, to compensate the contractor, the grantee, or other recipient of Federal assistance, as appropriate, for payment to each affected laborer and mechanic, of an amount equal to the difference between the rate received and the applicable prevailing wage rate, with interest on wages due at the rate specified in section 6621(c) of title 26, United States Code, from the date the work was performed by such laborers and mechanics. The Secretary shall make such a determination only where the Secretary has notified the agency or entity in question no later than one hundred and eighty days after completion of construction on the project that an investigation will be conducted concerning an alleged violation of this subsection.".

(h) TECHNICAL AMENDMENT APPLYING REFORM TO RELATED ACTS.—The Davis-Bacon Act is further amended by adding at the end the following:

"SEC. 8. No provision of any law requiring the payment of prevailing wage rates as determined by the Secretary in accordance with this Act shall apply to contracts for construction, alteration, or repair valued at $250,000 or less, or in the case of rent supplement assistance or other assistance for which the instrument of Federal financing or assistance does not have an aggregate dollar amount, where the assisted project is in the amount of $250,000 or less.".

(i) TECHNICAL AMENDMENTS.—

(1) The following is inserted before the first section:

"SECTION 1. This Act may be cited as the 'Davis-Bacon Act'.".

(2) The first section is amended by striking out "(a) That the" and inserting in lieu thereof "SEC. 2. (a) The".

(3) Sections 2 through 8 are redesignated as sections 3 through 9, respectively.

(4) Subsection (a) of section 3 (40 U.S.C. 276a–2) is amended by striking the first sentence and inserting in lieu thereof the following: "In accordance with regulations issued by the Secretary pursuant to Reorganization Plan Numbered 14 of 1950 (64 Stat. 1267), any wages found to be due to laborers and mechanics pursuant to this Act shall be paid directly to such laborers and mechanics from any accrued payments withheld under the terms of the contract. Any sums due laborers or mechanics under section 1, not paid because of inability to do so within three years, shall revert to or be deposited into the Treasury of the United States. The Administrator of General Services shall distribute a list to all departments of the Government giving the names of persons or firms that the Secretary has found to

have disregarded their obligations to employees and subcontractors.".

(j) COPELAND ACT PAPERWORK REDUCTION AMENDMENT.—Section 2 of the Act of June 13, 1934, entitled "An Act to effectuate the purpose of certain statutes concerning rates of pay for labor, by making it unlawful to prevent anyone from receiving the compensation contracted for thereunder, and for other purposes" (40 U.S.C. 276c) (commonly referred to as the "Copeland Act") is amended by striking out "shall furnish weekly a statement with respect to the wages paid each employee during the preceding week" and inserting in lieu thereof "shall furnish weekly a statement with respect to the wages paid each employee during the preceding week" and inserting in lieu thereof "shall furnish, at the beginning, midpoint, and conclusion of the period covered by the contract, a statement with respect to the weekly wages paid each employee during such period, except that such statement shall be furnished no less often than every three months.".

(k) REPORTS REQUIRED.—Beginning one year after the effective date of the amendments made by this Act, and at intervals of one year thereafter, the Secretary of Labor and the Comptroller General of the United States shall each prepare and transmit to the Congress a report describing the results of a review of the implementation, enforcement, ad-

ministration, impact on local wages, and impact on local and national economies of the Act of March 3, 1931 (the Davis-Bacon Act), the Act of June 13, 1934 (the Copeland Act), and the amendments made by this Act during the preceding twelve-month period, including recommendations for such further legislation as may be appropriate.

(l) EFFECTIVE DATE.—The amendments made by section 218 shall take effect sixty days after the date of enactment of this Act but shall not affect any contract in existence on that date or made pursuant to invitations for bids outstanding on that date.

## TITLE III—CIVILIAN PERSONNEL

### SEC. 301. REPEAL OF THE ONE HUNDRED AND EIGHTY-DAY LIMITATION PERIOD FOR THE HIRE OF RETIRED MILITARY MEMBERS.

Section 3326 of title 5, United States Code, is repealed.

### SEC. 302. OPTIONAL EXCLUSION OF PERFORMANCE RATINGS FOR CERTAIN TEMPORARY EMPLOYEES SERVING LESS THAN ONE YEAR.

Section 4301 of title 5, United States Code, is amended—

(1) by deleting "or" at the end of subparagraph (2)(F) and "and" at the end of subparagraph (2)(G);

(2) by inserting "or" at the end of subparagraph (2)(G); and

(3) by adding the following new subparagraph at the end of paragraph (2):

"(2)(H) an individual who is serving under temporary appointment for less than one year within the Department of Defense who agrees to serve without a performance rating unless such individual is being considered for (i) an increase in pay that is dependent on performance or (ii) a reappointment; and".

**SEC. 303. REIMBURSEMENT FOR HOUSE HUNTING TRIPS TO ALASKA AND HAWAII.**

Subsection (a) of section 5724a of title 5, United States Code, is amended by striking out in paragraph (2) "continental".

**SEC. 304. TRANSPORTATION FOR EMPLOYEES WHO DIE WHILE ASSIGNED TO ALASKA OR HAWAII OR WHO HAVE EXECUTED MANDATORY MOBILITY AGREEMENTS.**

Section 5742 of title 5, United States Code, is amended—

(1) in paragraphs (1) and (2) of subsection (b) by inserting "continental" after "outside the" in each instance, and

(2) by adding at the end the following new subsection (e):

"(e) The benefits under this section shall apply to an employee who has relocated pursuant to a mandatory mobility agreement executed as a condition of employment.".

**SEC. 305. SEPARATE MAINTENANCE ALLOWANCE FOR EMPLOYEES IN PANAMA**

Section 5924 of title 5, United States Code, is amended in paragraph (3) by inserting after "in a foreign area" "or in the Republic of Panama".

**SEC. 306. EXCEPTION TO $10 LIMIT ON REMOTE WORKSITE ALLOWANCE.**

Section 5942 of title 5, United States Code, is amended—

(1) by inserting "(a)" before "Notwithstanding", and

(2) by adding at the end the following new subsection (b):

"(b) The maximum allowance described in subsection (a) may be adjusted from time to time under regulations of the President, when necessary to alleviate deterrents to hiring and retaining employees at remote worksites.".

**SEC. 307. REPEAL OF REQUIREMENT FOR AUTHORIZATION OF CIVILIAN PERSONNEL BY END-STRENGTH.**

Section 115(b)(2) of title 10, United States Code, is repealed and paragraphs (3), (4), and (5) of section 115(b) are designated as paragraphs (2), (3), and (4), respectively.

**SEC. 308. REVISION TO PROHIBITIONS ON CERTAIN PERSONNEL MANAGEMENT CONSTRAINTS.**

Section 129 of title 10, United States Code, is amended to read as follows:

"(a) The civilian personnel of the Department of Defense shall be managed each fiscal year solely on the basis of and consistent with the workload required to carry out the functions and activities of the department and the appropriations and funds available to the department for such fiscal year. The management of such personnel in any fiscal year shall not be subject to any statutory end-strength or work-year constraint or limitation, and the management of such personnel in any fiscal year shall not be subject to any statutory end-strength or work-year floor or minimum staffing level.

"(b) The number of, and the amount of, funds available to be paid to indirectly funded Government employees of the Department of Defense may not be—

"(1) subject to any statutory constraint or limitation on the number of such personnel who may be employed on the last day of a fiscal year; or

"(2) managed on the basis of any statutory end-strength or work-year.

"(c) In this section, the term 'indirectly funded Government employees' means civilian employees of the Department of Defense who are employed by industrial-type activities or

commercial-type activities described in section 2208 of this title.".

**SEC. 309. REPEAL OF CEILING ON EMPLOYEES IN HEADQUARTERS AND NONMANAGEMENT HEADQUARTERS AND SUPPORT ACTIVITIES.**

(a) Sections 194, 3014(f)(1), 5014(f)(1), and 8014(f)(1) of title 10, United States Code, are hereby repealed.

(b) The table of sections for subchapter I of chapter 8, United States Code, is amended by striking out the last line (relating to section 194).

**SEC. 310. HOMEOWNERS ASSISTANCE TO CERTAIN EMPLOYEES OVERSEAS.**

Section 3374 of the Demonstration Cities Metropolitan Development Act of 1966, as amended (42 U.S.C. 3374), is amended by adding at the end the following new subsection (o):

"(o) Notwithstanding the provisions of subsections (b) and (c), Federal employees and nonappropriated fund personnel serving overseas with reemployment rights to an organization undergoing a base closure, wholly or in part, or a reduction in scope of operations, shall be entitled to the benefits of this section to the same extent that they would be had they remained with the organization.".

## TITLE IV—REAL PROPERTY

### SEC. 401. REVENUE FROM SALE OF EXCESS DEPARTMENT OF DEFENSE LAND.

Section 204 of the Federal Property and Administrative Services Act of 1949 (40 U.S.C. 485) is amended—

(1) in subsection (a) by striking "subsections (b), (c), (d), and (e) of this section" and inserting in lieu thereof "subsections (b), (c), (d), (e), and (h) of this section";

(2) in subsection (b) by striking "All the proceeds" in the first sentence and inserting in lieu thereof "Except as provided in subsection (h), all the proceeds"; and

(3) by adding at the end the following new subsection (h):

"(h) Whenever the Secretary of Defense determines that land under the control of the Department is excess property, as defined by section 3 of this act, the Secretary will request the Administrator of General Services to dispose of that property in accordance with this Act. If, as a result of this process, the land is sold and revenues are realized, the Administrator will, in the manner and to the extent provided in an appropriation Act, deposit half of the net proceeds from the sale of the excess land to a special account of the Department of Defense to be used to meet the Department's mission

essential requirements that are in the best interest of national defense.".

**SEC. 402. REVIEW FROM OUTLEASING OF DEPARTMENT OF DEFENSE ASSETS.**

Subsection (d) of section 2667 of title 10, United States Code, is amended to read as follows:

"(d) Payments for utilities or services furnished to a lessee under a lease authorized by this section shall be covered into the Treasury to the credit of the appropriation from which the cost of furnishing them was paid. Half of the money rentals received under this section, in excess of payments for utilities or services furnished to the lessee, may be retained and expended by the Secretary concerned, in the manner and to the extent provided in an appropriation Act, to meet mission essential requirements. The remainder of money rentals shall be covered into the Treasury as miscellaneous receipts.".

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THE SECRETARY OF DEFENSE

WASHINGTON, THE DISTRICT OF COLUMBIA

April 5, 1990

The Honorable Dan Quayle
President of the Senate
Washington, D.C. 20515

Dear Mr. President:

I have the honor to transmit for the consideration of the Congress the Administration's proposed "Defense Management Improvement Act." This legislation further implements the recommendations of the Packard Commission and my July 1989 Report to the President on Defense Management. The legislation is an important element of the President's Program and will substantially strengthen the Department's ability to use available resources effectively.

Shortly after his inauguration, the President announced his intention to implement the Packard Commission recommendations. When he asked me to become Secretary of Defense, he made it clear that the effort to strengthen and streamline the management of the Department of Defense was one of our top priorities. This legislative initiative is a significant step forward in reaching this goal.

The "Defense Management Improvement Act" provides a statutory foundation for improvements in defense acquisition, military and civilian personnel management, and the management of real property. Enactment of this legislation will increase efficiency and effectiveness of our activities and reduce the size and cost of our defense structure. It will remove many legal road blocks that currently inhibit sound management of the Department. Enactment of the legislation will help the Department perform its crucial national security mission and over time realize substantial savings for America's taxpayers.

I urge prompt enactment of this legislation in this session of Congress.

Sincerely,

Dick Cheney

## SECTION-BY-SECTION ANALYSIS

## TITLE I - - MILITARY PERSONNEL

### SEC. 101.

Amends 37 U.S.C. § 308 to allow the Secretary of Defense to terminate Selective Reenlistment Bonus (SRB) payments in cases where a member who is receiving such payments does not complete the term of enlistment or ceases to perform in the military specialty for which the bonus was paid.

Under current regulations, an SRB recipient who separates early under hardship or dependency reasons receives the SRB balance upon separation regardless of time served in the SRB skill. Additionally, persons who are reclassified or reassigned out of the SRB skill for reasons beyond their control either separate and receive the SRB balance or retrain and continue receiving SRB anniversary payments.

This section would prevent SRB recipients who separate under hardship/dependency from receiving the unearned portions of their reenlistment bonus upon separation. It would also include other not-for-cause reclassification such as humanitarian reassignment to other duties, loss of security clearance through no fault of the member, injury, illness or impairment not the result of the member's misconduct, pregnancy, and failure to attain a higher standard of technical qualification required for effective performance in the military specialty after payment of the bonus. This provision would not suspend any SRB payments from members reclassified as a result of service- directed employment in another specialty to meet Continental United States (CONUS) and overseas rotation, sea and shore rotation, or other mission essential requirements, since these actions are used exclusively to meet the needs of the military service and suspending the full SRB contract would unfairly penalize service members and diminish the integrity of the SRB program.

### SEC. 102.

Repeals 37 U.S.C. § 308(g) and 308(a)(c) thereby providing the Department of Defense with permanent authority to pay bonuses under the Enlistment Bonus (EB) and Selective Reenlistment Bonus (SRB) programs.

Under the present statutes, authority to pay EB and SRB expires on September 30, 1992. This date coincides with the end of fiscal year 1992. Therefore, Congress must provide for continued authority in the fiscal year 1993 Defense Authorization Act. If an Authorization Act is not passed by Congress and signed by the President prior to the beginning of fiscal year 1992, the services will be unable to approve new contracts for enlistment or reenlistment into critical skills until such time as the new Authorization is enacted.

### SEC. 103

Amends 10 U.S.C. § 521 by adding a new sentence at the end of subsection (a). The amendment clarifies the authority of the Secretary of Defense to use the increase in officer strength authorized under 10 U.S.C. § 115(b)(1)(E) (as amended by section 204 of

the bill) when determining the total number of officers authorized to be on active duty in an armed force at the end of a fiscal year, provided that the resulting number in an armed force does not exceed the number otherwise directed by Congress for that armed force, by more than one-half of one percent.

SEC. 104.

Amends 10 U.S.C. § 115b to allow the Secretary of Defense to shift authorized end strength and reprogram funds between active and reserve components of each of the Armed Forces so that the Secretary of Defense has full use of authorized end strength and corresponding funds for all components of the Armed Forces when responding to contingency operations or force restructure. It would allow smooth transfer of units from active to reserve components as part of force restructure and provide the ability to work within congressionally authorized total force fiscal year end strength limits to conduct contingency operations directed by the President.

SEC. 105

Substitutes a new 10 U.S.C. § 630 that would retain existing provisions of section 630 that allow for discharge of regular officers with less than five years active commissioned service, but adds a new provision, that would permit the Secretary of the military department concerned to involuntarily release from active duty and transfer to the Ready Reserve any regular officer with less than eight years of active commissioned service, who has remaining obligated service, whether that obligation is pursuant to law (10 U.S.C. § 651) or service regulations. Assuming the officer is otherwise qualified, he or she shall be tendered a reserve appointment. Any officer who declines the tenured reserve appointment will be transferred to the reserve component in an enlisted status under existing provisions of law.

Existing statute provides no option, short of discharge, for the Secretary concerned to direct the release of a regular officer from active duty and to then utilize the officer in the reserve component for any remaining service obligation. The Secretary must discharge a regular officer or retain the officer on active duty, even though the officer's skills may be "excess" to active duty requirements and in short supply in the reserve component.

Subsection (d) of the revised section 630 specifies that this section does not apply to officers separated "for cause" pursuant to Chapter 60, nor to officers in the grade of captain, or lieutenant (senior grade) in the Navy, who are discharged for failure of promotion under section 632 of title 10.

SEC. 106.

Adds 10 U.S.C. § 3583, 5509 and 8583 so as to permit the Secretary of the military department concerned to authorize an officer retired in a grade below the highest grade held on active duty, pursuant to 10 U.S.C. § 1370(a)(2), to retain the rank and insignia of grade of the highest grade in which the officer served on active duty satisfactorily for a period of at least 18 months. An officer who is allowed to retain the rank and insignia of the higher grade pursuant to the authority of this section shall, for all purposes of law other than computation of retired pay, be considered to have retired in the

higher grade.

Current law requires that officers selected for promotion to the grade of lieutenant colonel or commander and above, serve a full three years in grade before being allowed to retire in that pay grade. Officers who voluntarily retire prior to completion of the required time-in-grade must retire in the next lower grade. Allowing an officer to retire voluntarily at the pay scale applicable to the lower grade, but to retain the insignia of the higher grade and the nonfinancial deference accorded the higher grade in professional associations, would serve to eliminate any stigma, and encourage additional retirements without increasing retirement costs.

SEC. 107.

Authorizes involuntary retirements of regular Navy officers designated for limited duty (LDOs) who are serving in the grades of commander and captain. Under this section, a commander not on a promotion list for captain, would be required to retire upon completion of 35 years of active naval service or the second failure of selection for promotion to the grade of captain, whichever occurred first. A captain would be required to retire upon completion of 38 years of active naval service.

Mandatory retirements of LDO commanders and captains are now governed by the same provisions that apply to non-LDO's in the same grade, 10 U.S.C. § 633 and 634. Those provisions require the retirement of a commander who is not on a promotion list when the officer completes 28 years of active commissioned service and of a captain on completion of 30 years of active commissioned service. In the case of the LDO community, retaining officers until those service points significantly restricts promotion flow points for more junior officers compared to flow points under a system that required separation following the second failure of selection for captain or a shorter term of service.

SEC. 108.

Amends 10 U.S.C. § 611(a) to allow the Secretary of Defense to waive the requirement in existing law to convene a selection board to recommend officers for promotion to captain or lieutenant (senior grade), whenever the determination required by 10 U.S.C. § 622 reveals that the number of officers which should be recommended to meet projected vacancies in the grade and competitive category, is greater than or equal to, the number of officers eligible to be considered by the prospective selection board. Officers in the prospective zone of consideration would be considered for promotion under service regulations.

Also amends 10 U.S.C. § 624(a) to require that the names of officers approved for promotion under the waiver authority of the Secretary of Defense (as described above) be placed on a promotion list for the competitive category in order of seniority consistently with the existing statutory requirement for officers recommended for promotion by a selection board convened in accordance with 10 U.S.C. § 611(a).

Also amends 10 U.S.C. § 631 to add the provision that an officer who is considered for promotion under the waiver authority specified in subsection 213(a) of the bill, but whose name is not placed on the promotion list as required by subsection 213(b) of the bill, shall be considered to have failed of selection for promotion.

A board to select officers for promotion from lieutenant (lieutenant (junior grade) in

the Navy) to captain (lieutenant (senior grade) in the Navy) is not appropriate in those competitive categories where constructive service credit is awarded and the promotion process is "fully qualified." Consideration for promotion to this junior grade in some categories (e.g., Chaplains) is essentially noncompetitive (i.e., "fully qualified") and occurs normally within three to six months of entry on active duty. Allowing the Secretary of Defense the option to utilize a board to select officers for promotion to captain (lieutenant (senior grade) in the Navy) would improve the effectiveness and efficiency of force management for professional branch officers.

SEC. 109.

Authorizes the expenditure of appropriated funds to pay the meal and lodging expenses of members who are directed to reside at a location other than their normal duty location, but within the limits of the duty station. Such duty, performed within the limits of the duty station, does not fall within the provisions of 37 U.S.C. § 404 Code, as the members are not considered away from the permanent duty station. Therefore, the expenses associated with such duty are not reimbursable.

The proposal would amend 37 U.S.C. § 408 by adding a new subsection (b) that would authorize joint travel regulations to permit an entitlement to travel and transportation allowances under 37 U.S.C. § 404 when ordered to perform duty at a location within the normal limits of the duty station but at a location where the member would be away from his or her residence or duty location for a period of time that would require overnight accommodations.

SEC. 110.

Replaces the fixed numerical limits on the number of personnel in pay grades E-8 through E-9 who may be on active duty as of the end of any fiscal year by substituting force structure requirements as adjusted within funding availability in the defense appropriation act or continuing resolution for that fiscal year. Also repeals 10 U.S.C. § 517, which provides the fixed numerical limits.

## TITLE II -- ACQUISITION

SEC. 201.

Amends 10 U.S.C. 2306(h) and repeals section 9021 of P.L. 101-165, to eliminate certain requirements that must be met before entering into a multiyear contract. Current law requires that multiyear candidates meet certain criteria prior to forwarding them to Congress for approval. Among these criteria is a requirement that the multiyear achieve a 10 percent savings over current negotiated contracts or over annual contracts. This requirement could result in the Department of Defense missing opportunities to realize significant savings simply because the arbitrary percentage threshold is not met. Section 201 will enable the Department to take greater advantage of potential savings and thereby promote greater program stability.

SEC. 202.

Furthers the recommendations of the Defense Management Review that the Department of Defense place greater reliance on commercial products and commercial-style procurement practices. This section authorizes the head of an agency to use simplified commercial-style procurement procedures for the acquisition of commercial products. These procedures will place greater emphasis on the use of product descriptions rather than detailed specifications. Procurements using these procedures will be further streamlined by requiring that a product have achieved commercial acceptance in order to compete as a commercial product. However, products that have been supplied under recent or current contracts for the same agency requirements may also be considered if such products otherwise meet the criteria that commercial products must meet and are evaluated on an equal basis with the commercial products. These procedures will enable contracting officers to avoid using detailed specifications and having to conduct extensive source reviews and product tests and evaluations. This section also will permit selecting products on the basis of the greatest benefit to the agency. This section would make inapplicable to the purchase of commercial products provisions of law that relate generally to source preferences and unique contract requirements if they are not equally applicable to contracts to which the United States Government is not a party. It is not the intent of this section to affect or impair existing authorities with respect to the required use of GSA as a source of supply. These are provisions that frequently prohibit or discourage many sellers of commercial products from competing for Government contracts. Finally, this section would establish in the Department of Defense a three year pilot program at components designated by the Secretary of Defense for the filing of protests by interested parties in connection with the acquisition of commercial products with an official designated to hear protests. During the period of the pilot program, this procedure shall be the sole administrative remedy available to interested parties.

SEC. 203.

Repeals the commercial pricing certification requirement imposed by 10 U.S.C. 2323 (Public Law 98-525) as amended by section 926 of the Defense Acquisition Improvement Act (Public Law 99-500). Section 2323 requires the Department of Defense to obtain a certification from contractors that the Government is receiving the lowest commercial price for spare and repair parts procured using other than competitive procedures. The commercial pricing certification requirement is not cost-effective and its continued use imposes a burden on the procurement process without a beneficial return.

SEC. 204.

Amends 10 U.S.C. 2305 (b)(4) to authorize the Department of Defense to evaluate competitive proposals and award a contract without discussions to the offeror whose proposal represents the greatest benefit to the Government based upon the evaluation factors set out in the solicitation.

The Competition in Contracting Act permits award of a contract without discussions only if, among other requirements, it is demonstrated that award of an initial proposal would result in the lowest overall cost to the Government. Recent GAO cases have

interpreted this to mean that award can be made without discussions only to the lowest priced acceptable offeror.

In solicitations where an offeror other than the low offeror clearly provides the best technical proposal at a reasonable price, it is in the Government's best interest to award to that offeror. A round of discussions will not significantly improve the superior proposal, but will only result in unnecessary and potentially multiple requests for best and final offers and additional costs to the offerors and to the Government.

SEC. 205.

Amends title 10, United States Code, and the Federal Property and Administrative Services Act to exempt small purchases from certain socio-economic provisions, and amends
various socio-economic statutes to remove specific dollar thresholds in favor of language establishing a uniform threshold for their application at the small purchase threshold in section 2303 of title 10, United States Code or in section 303(g)(2) of the Federal Property and Administrative Services Act of 1949 for agencies other than those subject to title 10. The Armed Services Procurement Act of 1947 and the Federal Property and Administration Services Act of 1949 initially authorized small purchase procedures for procurements up to $1,000. Over the years, these Acts were amended to raise the small purchase threshold to $2,500, $10,000, and subsequently $25,000. Threshold adjustments reflected Congress' recognition of the impact of inflation on low dollar value purchases. Also over the years, Congress enacted legislation, generally outside of the major procurement statutes, which nonetheless imposed significant requirements on government acquisition. These statutes were frequently drafted so as to have little or no application to small purchases setting a "floor" in terms of contract dollar value at the existing statutory "ceiling" for small purchases. Although the "ceiling" for small purchases was regularly adjusted to account for the declining purchasing power of the dollar, the "floors" for applying other statutory requirements did not keep pace. Procedures originally intended to expedite the economic acquisition of low dollar value items and services are now subject to a wide array of relatively complex and costly administrative steps, solicitation provisions, and contract clauses.

SEC. 206.

Amends section 25 of the Office of Federal Procurement Policy Act, as amended by P.L. 100-679 (41 U.S.C. 421), to permit designation in the Department of Defense of an official at an organizational level not lower than an Assistant Secretary of Defense within the Office of the Under Secretary of Defense for Acquisition to serve on and attend meetings of the Federal Acquisition Regulatory Council. By law, only the USD(A) may be designated by the Secretary of Defense to serve on the FAR Council. This places the USD(A) in the unworkable position of having to attend all sessions of the Federal Acquisition Regulatory Council. With the other extensive responsibilities of the USD(A), this may result in DoD not being represented at a large number of Council meetings and could serve to unreasonably delay the issuance of needed policies and procedures. The other agency members of the FAR Council are not faced with a similar problem since those agencies were authorized to designate their Procurement Executives to serve on the

Council.

SEC. 207.

Amends 10 U.S.C. 2438 to require a cost benefit analysis before undertaking dual sourcing for major programs and subsystems. Currently, section 2438 assumes that dual sourcing is appropriate for most major systems and subsystems and requires detailed justification when dual sourcing is not considered appropriate. Dual sourcing decisions should be made on a case-by-case basis, with detailed consideration of cost and other factors. Any unit cost savings times the number of units to be procured competitively should be sufficient to amortize the costs associated with dual sourcing. These costs include facility costs, shorter production runs, lower production rates, duplicative qualification costs, "educational buys," and the costs associated with technology transfer. This amendment recognizes the fact that the dual sourcing decision is a complex one and that dual sourcing is not suited to every major program. The change retains a preference for dual sourcing, but allows the Secretary of Defense more flexibility in reaching a decision on this issue.

SEC. 208.

Revises the threshold for the mandatory submission of certified cost or pricing data, established under the Truth in Negotiations Act, from $100,000 to $500,000 (10 U.S.C. 2306a). Submission of certified cost and pricing data is required for contracts, modifications, and subcontracts, over the stated threshold, except when the price agreed upon is based on: adequate price competition; established catalog or market prices of commercial items, or, law or regulation. The current threshold should be escalated to reflect inflation. In addition, raising the threshold will significantly reduce the paperwork burden on the government and on contractors, and will be consistent with the thresh- old for Cost Accounting Standards, that was raised to $500,000 in 1988.

SEC. 209.

Repeals the exception to 10 U.S.C. 7299a(d) that requires that short-term repair work (6 months or less) on ships assigned to the Naval Reserve Force that are homeported on the West Coast be competed without regard to area. This is an exception to the general provisions of section 7299a(d) that permit a limited area for competition if adequate competition is available in that area. The proposal would repeal the exception to the general provision thereby affording the Secretary of the Navy the authority to permit short-term repairs to be solicited only in the homeport area unless inadequate competition exists, in which case the solicitation would be expanded to include the next adjacent homeport area.

SEC. 210.

Repeals 10 U.S.C. 7313 that requires that the Secretary of the Navy ensure, prior to award of a project for repair, alteration, overhaul, or conversion of a naval vessel following competition between public and private shipyards, that the certain criteria must be met.

The bid of the public shipyard must include (a) the full cost to the United States associated with future retirement benefits of civilian employees of that shipyard consistent with computation methodology established by the Office of Management and Budget Circular A-76 and (b) in a case in which equal access to the Navy supply system is not allowed to public and private shipyards, a pro rata share of the costs to the Navy supply system. Costs applicable to oversight of the contract by the appropriate Navy Supervisor of Shipbuilding, Conversion and Repair must be added to the bid of any private shipyard for the purpose of comparability analysis. The award is required to be made using the results of the comparability analysis. Repeal of the provision would allow the Navy to follow the intricate methodology worked out with Congress since the inception of the public/private competition program.

SEC. 211.

Repeals a provision of the Department of Defense Appropriations Act, 1990 which provides that the Department of the Navy may use no funds in the fiscal year 1990 Appropriations Act to enter into contracts for the overhaul, repair or maintenance of any naval vessel homeported on the West Coast of the United States which includes charges for "interport differential" as an evaluation factor for award. Repeal of the provision would make 10 U.S.C.7299a(c) the controlling provision. This section requires the Secretary of the Navy, in determining the cost or price of work to be performed in an area outside the homeport of the vessel, to consider foreseeable costs of moving the vessel and its crew from the homeport to the outside area and from the outside area back to the homeport of the vessel after completion of the contract.

SEC. 212.

Repeals 10 U.S.C. 2464 which restricts the acquisition of "core logistics functions" by commercial contracts. This provision of law is no longer necessary as adequate procedures have been developed by the military services and are in place to determine the applicability of performing depot maintenance functions organically or by contract.

SEC. 213.

Repeals 10 U.S.C. 2465 and 10 U.S.C. 2466, pertaining to the performance by contractors of so-called "commercial activities" for the Government. Section 2465 bars the use of appropriated funds to acquire fire fighting and security guard services for military installations. Section 2466, as recently amended by section 313 of the 1990 National Defense Authorization Act, bars the Army and Air Force from competing depot maintenance tasks among Government maintenance activities and private contractors.

SEC. 214.

Creates an exception to the prohibition in 10 U.S.C. 2324(e)(1)(M) regarding payment of the costs of severance pay paid to foreign nationals employed by Government service contractors outside the United States. Currently such costs are unallowable to the extent that they "exceed the amount paid in the industry involved under the customary or

prevailing practice for firms in that industry performing similar services in the United States..."

The proposed exception in the nature of a proviso at the end of the subparagraph would make severance pay paid in order to comply with local host nation laws governing such payments allowable notwithstanding that such payments are out of line with the compensation practices of comparable United States firms.

Subsection (b) of section 214 would make clear that the proviso added by this amendment applies not only to contracts entered into after the date of the legislation's enactment, but also to contracts entered into prior to the date of enactment, provided in all events that the costs were incurred by the contractor after the date of enactment.

SEC. 215.

Amends 10 U.S.C. 2208(h) to authorize arsenals and other Army industrial activities to sell supplies, services, or work outside the Department of Defense if the articles to be sold may be incorporated into items to be sold to or used in a contract with, or for the purposes of soliciting a contract with a friendly foreign government, or will be used in commercial expendable launch vehicles.

SEC. 216.

Authorizes the military departments and the defense agencies to require contractors to print technical data rather than requiring them to deliver the data as directed by the Government Printing Office for printing. This will reduce the cost of defense procurement of technical data, improve defense data management procedures, and remove one barrier to the use of commercial products by the Department of Defense.

SEC. 217.

Adds a new section 2332 to title 10, United States Code. Subsection (a) would authorize the Secretary of Defense to conduct a pilot program for up to six major defense programs in order to test methods to increase the effectiveness and efficiency of the acquisition process. This section would also permit the Secretary to waive, for purposes of the pilot program, any provision of law or of regulation that he is not otherwise entitled to waive, that is not equally applicable to contracts to which the United States government is not a party and that:

(1) prescribes procedures for the procurement of supplies or services;

(2) prescribes preferences to be given to sources or mandates particular sources;

(3) prescribes requirements to be imposed on contractors that relate to the contractor's performance of the contract, or that

(4) prescribe requirements governing cost allowability, cost accounting, or auditing, except for provisions intended to assure financial integrity for the conduct of government programs. "Assuring financial integrity" involves the determination that government use of funds is accurately identified and reported.

Subsection (a) also would permit the Secretary to waive any provision of law or regulation that he is not otherwise authorized to waive that prescribes requirements for the

management, testing, evaluation of, or reporting on, a program.

Subsection (b) would permit the Secretary to designate up to six major defense acquisition programs, as defined in 10 U.S.C. 2430, for participation in the pilot program.

Subsection (c) would require the Secretary to promulgate regulations to implement the pilot program within 270 days after the date of enactment of this law.

Subsection (d) would require the Secretary of Defense to provide the Congress notice of his intention to designate a major defense acquisition program for inclusion in the pilot program.

SEC. 218.

Amends the Act of March 3, 1931 ( the Davis Bacon Act) to raise the threshold for application of the statute to contracts in an amount of $250,000. This will encourage greater participation by small and minority businesses and will reduce the administrative burden on agencies. This section would also permit greater use of entry- and training-level "helpers" by recognizing a semi-skilled helper classification; require separate wage surveys to be conducted for rural and urban areas; prohibit splitting up large contracts to avoid the threshold; move responsibility for debarment of firms or persons violating Davis Bacon from the Comptroller General to the Department of Labor. Finally, this section would significantly reduce the paperwork burden by reducing from weekly to quarterly the required submission of detailed payroll records to the government -- at a minimum, three submissions would be required, at the beginning, midpoint, and conclusion of the contract period.

## TITLE III - CIVILIAN PERSONNEL

SEC. 301

Repeals 5 U.S.C. 3326 which generally prevented employment of retired military members within 180 days of their retirement. The 180 day waiting period for retired military members often discourages well qualified and highly trained candidates from competing for civilian positions in the Department of Defense. Elimination of the waiting period will enable DoD to better compete with the private sector for applicants with critical skills.

SEC. 302

Amends 5 U.S.C. 4301(2) to exclude from system coverage temporaries serving on less than 1 year appointments within the Department of Defense except upon pay change or reemployment. Temporary appointments do not warrant the expenditure of time and resources required by the performance appraisal process. Such coverage overloads administrative systems, drains manpower and increases paperwork.

SEC. 303

Amends 5 U.S.C. 5724a to provide house-hunting trips to Hawaii and Alaska. This will facilitate recruitment by providing the same relocation benefits to employees transferring to Alaska and Hawaii as to other states.

SEC. 304

Amends 5 U.S.C. 5742 to include employees or family members assigned in Alaska or Hawaii and employees who have signed mandatory mobility agreements as a condition of employment among those for whom transportation of remains, dependents and effects are authorized. Enactment on this change will remove a deterrent to recruitment for positions in Alaska, Hawaii or under mandatory mobility agreements.

SEC. 305

Amends 5 U.S.C. 5924 to include the Republic of Panama as a post of assignment for which separate maintenance allowance may be authorized. This will help avoid imposition of unacceptable economic burdens on current and future employees who would otherwise be required to establish and/or maintain a second residence at their own expense where family members may not accompany the employee to Panama or must be evacuated at the direction of the Government.

SEC. 306

Amends 5 U.S.C. 5942 by providing that the $10 maximum allowance will not apply within DoD and by authorizing the Secretary of Defense to adjust the remote worksite allowance to alleviate deterrents to hiring and retaining employees. This will facilitate hiring and retaining employees and will increase an allowance set almost 20 years ago. The current rate is inadequate to cover the expenses, hardships, and inconveniences associated with assignments on isolated islands or sites in deserts or other areas remote from civilization.

SEC. 307

Repeals 10 U.S.C. 115(b)(2) which provides that Congress shall authorize civilian personnel end strength for each component of the Department of Defense. These work force floors and ceilings restrict the authority of the Secretary of Defense and the Service Secretaries, and their ability to effectively manage the Department's resources consistent with changing missions and overall personnel requirements.

SEC. 308

Amends 10 U.S.C. 129. These work force floors and ceilings restrict the authority of the Secretary of Defense and the Service Secretaries, and their ability to effectively manage the Department's resources consistent with changing missions and overall personnel requirements.

Subsection (a) of amended section 129 deletes the requirement to manage the civilian personnel of the Department of Defense on the basis of authorized end strength and provides that the management of such personnel shall not be subject to any statutory end strength, work year floor or minimum staffing level.

Subsection (b) of amended section 129 deletes the prohibition against military secretary control of the number of or funds available for indirectly funded employees of the Department of Defense.

Subsection (c) of amended section 129 reenacts existing subsection (c)(1). As amended, subsection (c) no longer includes in the definition of "indirectly funded" employees those "whose salary and benefits are funded from sources other than appropriated funds."

SEC. 309

Repeals 10 U.S.C. 194, 3014(f)(1), 5014(f)(1) and 8014(f)(1) which enacted numerical limits on the numbers of personnel assigned or detailed to management headquarters activities, management headquarters support activities or to Department headquarters staff. These work force floors and ceilings restrict the authority of the Secretary of Defense and the Service Secretaries, and their ability effectively to manage the Department's resources consistent with changing missions and overall personnel requirements.

SEC. 310

Amends the Demonstration Cities Metropolitan Development Act of 1966, as amended, 42 U.S.C. 3374, to apply to nonappropriated fund employees and to provide employees serving overseas with reemployment rights the same homeowner's assistance benefits that they would have received had they remained with the CONUS-based organization undergoing closure or reduction. Currently employees serving on overseas tours, accompanied by their dependents, and employees serving overseas 15 months or more after announcement of the closure or reduction in their CONUS organization are not covered by the homeowners assistance program. This is extremely disruptive to individuals overseas and might deter homeowners from accepting overseas assignments if there is the potential that their CONUS organization might undergo closure or reduction while they are overseas.

## TITLE IV REAL PROPERTY

SEC. 401.

Amends sections 204 of the Federal Property and Administrative Services Act of 1949 (40 U.S.C. 485) to permit the Department of Defense to receive half of the revenues generated by the sale of excess real property under the control of the Department. Under the proposal the Administrator would deposit half of the net proceeds into a special account of the Department of Defense in the manner and to the extent provided in an

appropriation act. Currently, section 204 requires that these revenues be deposited into the Treasury as miscellaneous receipts. Section 204, as amended, would provide a strong incentive for managers of real property under the control of the Department of Defense to examine the long-term requirements for land and determine if certain parcels are necessary for the nation's military strategy or could be declared excess for sale.

SEC. 402.

Amends 10 U.S.C. 2667 to permit the Secretary of a military department to retain half of the net proceeds received as rent for leases of property under the control of the Department. Under the proposal, the authority of the Secretary concerned to retain or to expend such proceeds would be exercised in the manner and to the extent provided in an appropriation act. Currently, section 2667 requires that this money be deposited into the Treasury as miscellaneous receipts, except for rent received under a lease for agricultural or grazing purposes. Section 2667, as amended, would encourage installation commanders and other real property managers within a military department to examine their immediate land use requirements with a view to increasing the use of leases where deemed appropriate.

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THE SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301

SENATE ARMED SERVICES COMMITTEE
1990 APR -5 PM 4:55

April 5, 1990

Enclosure in Log Letter File

Honorable Sam Nunn
United States Senate
Washington, D.C. 20510

Dear Sam:

I am pleased to provide you with a copy of the White Paper on the Department of Defense and the Congress, which the Department prepared in accordance with our July 1989 Defense Management Report to the President. This White Paper provides a blueprint for improving the processes by which the executive and legislative branches work together to carry out one of our most basic constitutional responsibilities -- providing for the common defense.

As one who has worked in both the executive and legislative branches, I believe that implementation by the Congress of the recommendations in the White Paper would forge a stronger partnership between the two branches and would contribute greatly to achievement of the objectives of the Defense Management Report. It would be a major step forward in maintaining the Nation's strength and bringing greater efficiency to government.

The Department of Defense will continue to work closely with the Congress, and especially the leadership of the Armed Services Committees and the Defense Appropriations Subcommittees, to maintain strong defenses. We also will encourage Congress to adopt more effective internal processes for handling defense issues, such as biennial budgeting, to provide stability and greater economies. Such positive changes will benefit the Nation greatly. I look forward to working with you on these important matters.

Best regards,

Dick Cheney

# WHITE PAPER

# ON

# THE DEPARTMENT OF DEFENSE

# AND THE CONGRESS

## REPORT TO THE PRESIDENT
## BY THE SECRETARY OF DEFENSE
## JANUARY 1990

29-575 0 - 91 - 43

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## EXECUTIVE SUMMARY

Every recent study of defense management and organization has concluded that reform of the Congressional defense oversight process is a necessary element in an effort to improve defense management. Most specific recommendations have focused on reform of the budget process, including the annual defense authorization. The scope and level of detail in the annual Congressional defense budget review has grown significantly over the past twenty years or more, with many measures of activity doubling or trebling in short periods. The nearly complete overlap of the defense authorization and appropriation processes is one of the most notable aspects of the budget review. Other notable features include the large number of budget line-item changes and other directions to the Department of Defense (particularly affecting specific programs and activities) and the activities of committees without direct defense oversight responsibilities which nonetheless significantly affect defense resources and operations.

Factors which have led to the growth in Congressional defense activity include: the large portion of discretionary spending in the federal budget represented by defense; the desire of Members of Congress to serve constituent interests; competition within the Congress due to a reduction in the power of committees and the blurring of jurisdictional lines; and, the frequently adversarial relationship between Congress and the Department of Defense.

The duplication, complexity and lack of coordination in the Congressional defense process is, in itself, a hindrance to better management of the Defense Department. Among the negative results of this process are conflicting mandates, delays and increased costs in programs (totalling over half a billion dollars at a minimum), and instability in planning. The most damaging aspect of the current Congressional defense process is the degree to which it

consumes the time and attention of defense managers and Members of Congress. Excessive debate over budget details significantly limits the degree to which Congress and top defense managers can concentrate on national goals and strategy or operational and policy matters.

Many in Congress, and leaders of the Armed Services Committees in particular, recognize these difficulties and have already taken steps to address them. Proposals for additional changes in the budget process or in committee jurisdictions abound. Seeking consensus about the goals of reform may be more helpful to the cause of improving defense management than endorsements of specific initiatives. These goals must include:

--the re-establishment of trust between DoD and the Congress,

--lengthening the time horizon and reducing detail and redundancy in the budget process;

--focusing Congressional oversight on more significant aspects of defense policy; and,

--better integrating Congressional policy goals and directives.

## I. INTRODUCTION

> The Armed Services Committee now authorizes almost every element of the defense budget each year, down to almost the last screw and bolt....At its worst this tendency has spurred not unreasonable charges of congressional "micromanagement"....But even more troublesome, this trend to micromanagement has the staff and members focusing on the grains of sand on the beach while we should be looking over the broad ocean and beyond the horizon.[1]

From 1789 until the Budget and Accounting Act of 1921 and the Classification Act of 1923, Congress budgeted for practically every individual position in the executive branch with a separate line item. Control was incredibly detailed, but Congress was spending increasing amounts of time working on matters of decreasing importance. Congress had three choices: return to the inactive government of the pre-Civil War years, continue playing the role of accountants, or delegate the details. Congress chose to delegate and both Congress and the executive branch were able to operate more efficiently. Congress faces a similar choice today. It can retain control over the details or expand its vision to scan the oceans and horizon in a manner that is mutually beneficial to both branches.

This report is based on the premise that it is more important for both Congress and the executive branch to navigate the ocean than to pick at the sand grains while we let the ocean navigate us. Before a new vessel can be designed, however, it is appropriate first to make a chart of the currents.

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1. Sen. Sam Nunn, testimony before the Temporary Select Committee to Study the Senate Committee System, 98-2, Aug. 2, 1984, Part 2, pg. 64.

The basic structure of this report is as follows. Part II is a description of the existing Congressional process for defense policy and contains three different sections: (1) the Congressional defense budget process, (2) specific formal and informal program interventions, where interventions are defined as controls placed on specific programs as opposed to more general policy guidelines and, (3) committee jurisdictions. Part III attempts to analyze the incentives that promote many of the practices described in Part II, and Part IV makes the case for change by explaining the negative consequences of the existing system.

The final section (Part V) contains specific proposals for change. Because this report is about the effects of the Congressional process on DoD, most of the proposals address the legislative branch. That emphasis does not suggest that all difficulties with the DoD-Congressional relationship are the responsibility of the Congress. This White Paper is only one element of the Defense Management Report. Most of the activity in that report is directed at internal DoD reform, and there are several ongoing efforts in that regard. The purpose of this paper, however, is to look at the interaction between DoD and Congress; and to focus on ways the two might interact more effectively to improve the formulation and conduct of national defense policy.

## II. THE CONGRESSIONAL DEFENSE PROCESS

From the 1920s through the 1960s, power in Congress centered around the major committees and a few committee chairmen. Since then, power has flowed both upward and downward. Party leaders play a greater role on a few major issues, such as overall budget allocations. At the same time, on issues that fall below the top levels of political awareness, power has become diffuse. Members have built up their personal staff resources and assured a degree of independent power for Congress' 250 different subcommittees. The result is a marked increase in the number of members with the means, as well as incentive, to influence

national security policy. The Congressional process for defense has paralleled these broader developments.

The following pages describe three aspects of the Congressional defense process: the detailed annual budget review; the proliferation of interventions designed to guarantee specific outcomes rather than providing more general policy guidance; and, the large number of committees and subcommittees that play a role in formulating defense policy.

A. The Congressional Defense Budget Process

The major features that distinguish the U.S. legislative process for defense are the number of actors and the frequency of decisions. Virtually no other country puts its defense budget through such detailed legislative scrutiny every year, and none has that budget reviewed by as many as six independently powerful committees: the Budget, Armed Services and Appropriations Committees of both the House and Senate.

1. History and Development of Annual Defense Budget Review

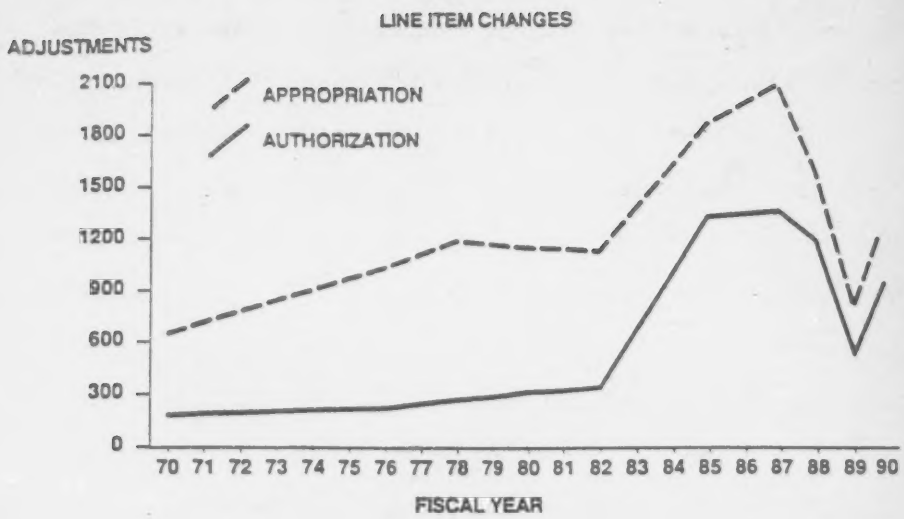
The annual review process was not always this cumbersome. Before 1959, Congress authorized weapons or forces without revisiting the issue annually. This changed by increments, with most of the yearly authorization mandates being adopted between 1959 and 1970. The Budget Committees were formed in 1974 and developments since that time have led to a growing preoccupation with the budget and a significant crowding out of other legislative activity. As a result, budget-related bills (including the defense authorization) have become the preferred means of enacting policy proposals even if unrelated to the budget. By 1983, annual authorizations were required for the entire defense budget. As the authorizing committees shifted away from yearly posture hearings and oversight of selected issues toward examining each line-item in every year's defense budget, their appropriations counterparts increased the scope of their review. Traditionally, the defense appropriations subcommittees

had focused on operations and manpower. Eventually, the budget reviews of all four committees had an almost complete overlap, with little discernible differentiation.

The 1985 Senate Armed Services Committee staff report on defense organization cited the dominance of the budget process as one of the "fundamental problems with Congress that affect defense oversight." (pg. 580) Despite the efforts of leaders on the defense committees to address this problem, the dominance of the budget review is probably more complete today than four years ago.

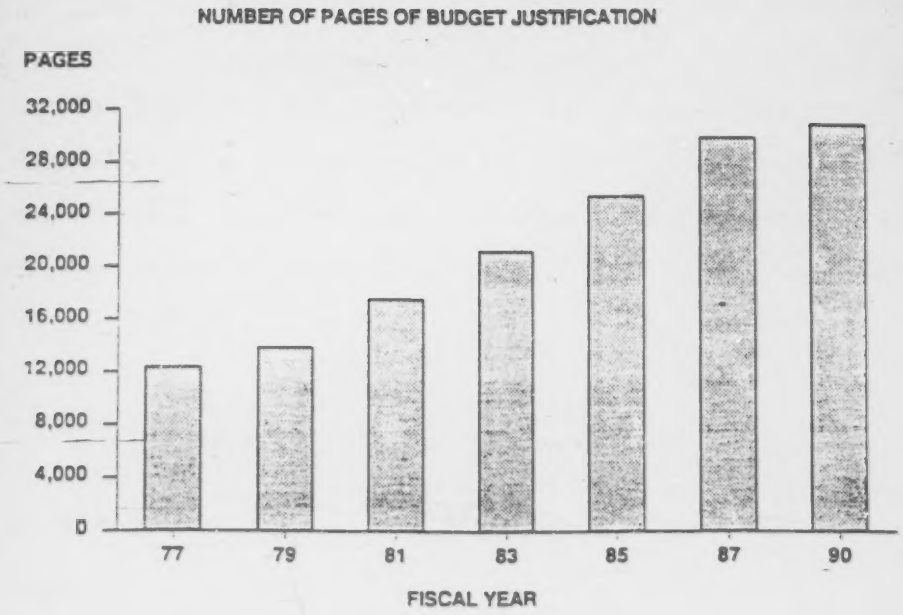
2. Detailed Level of Annual Budget Reviews

The microscopic focus of the budget review is evidenced by the number of line-item adjustments Congress makes to the defense authorization and appropriation bills. As can be seen in the chart below, appropriations line-item adjustments doubled during the 1970s and then grew by another 85% between 1982 and 1987. Authorization adjustments grew more slowly during the 1970s, but took a quantum leap between 1982 and 1985, almost quadrupling in four years. In peak years, the committees each alter more than 60 per cent of the line items in DoD's budget request.




The sharp drop in 1989 reflects the second year of the Department's first two-year budget, and of a late 1987 two-year agreement between congressional leaders and the President on the aggregate or "top line" figures for the federal budget's major functional categories, including defense. The number of adjusted line-items increased with the 1990 budget, but fell short of the pre-1989 levels.

Budget justification books are another measure which shows the growth and detail of the annual review. The content of these books is largely mandated by the Armed Services and Appropriations Committees. The 1977 budget justification ran 12,350 pages. For 1988, the justification took 30,114 pages -- almost two and a half times as many pages as eleven years earlier. (SEE TABLE) The fact that no one person can comprehend this material in total contributes to a myopic and disjointed review process.

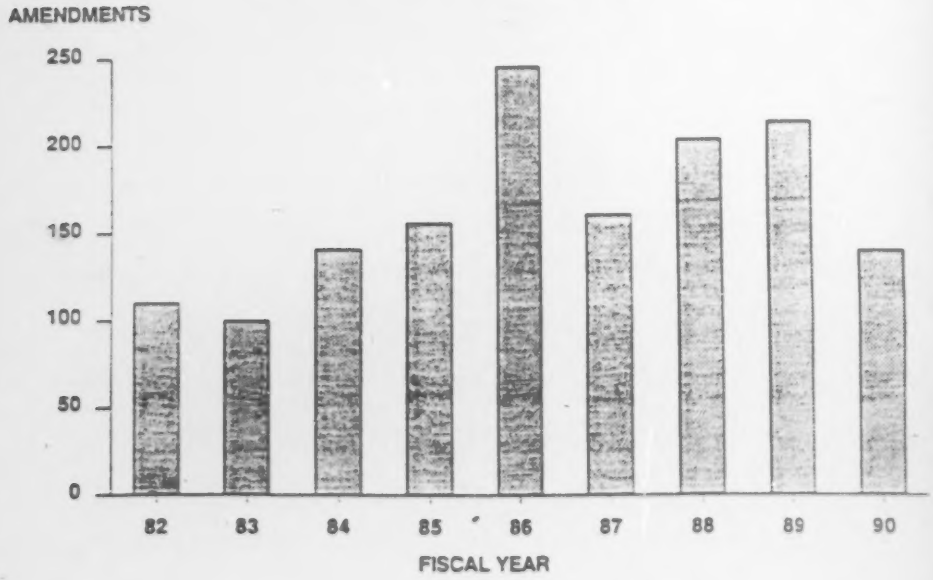



As with much other material provided to Congress, the justification books are used almost exclusively by staff. Congress could not have even considered such detailed budget review had it not been for a large increase in staff size. In 1964, the four defense subcommittees on Appropriations and the Armed Services Committees had a total of 37 staff members. By 1984, the same committees and subcommittees had 60 staff. Five years later the number was up to 99. And that does not include the 66 associate staff who work on defense for individual members of the same committees, or Congressional support agencies. From 1960 to 1985 total Congressional committee staffs grew by 237% and personal staffs

by 175%.[2] The growth of staff expands what Congress is able to do, greatly magnifying the level of detail in most of its work.

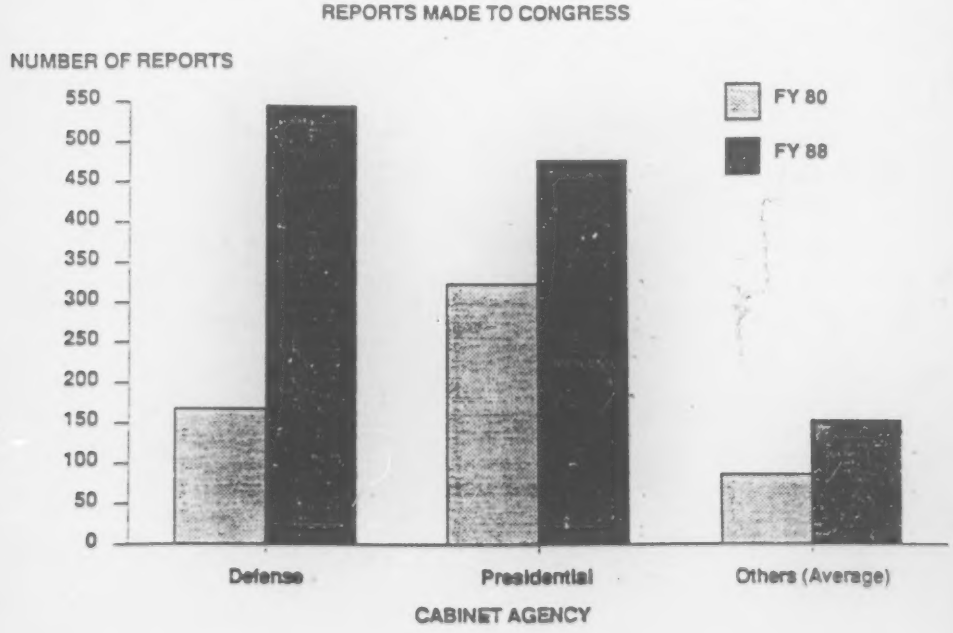
The detailed attention Congress gives the defense budget is also in evidence on the House and Senate floors. It has become almost commonplace for the House to spend more than 50 hours on the defense authorization bill -- and for the Senate to spend more. During those hours, each chamber typically adopts about 100 amendments. These are remarkable numbers to persist year after year.

AMENDMENTS ADOPTED TO THE DOD
AUTHORIZATION AND APPROPRIATION BILLS




2. Wilbur D. Jones Jr., "Congressional Involvement and Relations", Defense Systems Management College, Ft. Belvoir, VA, July 1989 [Second Edition], pg.20.

Most of the Department's recurring reports are also designed to assist Congress in its annual budget review. The growth in reporting requirements tracked in an annual compilation of "Reports Required by Congress" by the Clerk of the House is striking. The Defense Department recently passed the President as the largest producer of reports to Congress, and many of the Presidential reports are actually prepared by DoD. Between 1980 and 1988 DoD requirements grew by 224%, far faster than any other part of the government, and nearly three times the average growth of other agencies.[3]




DoD reporting requirements are so voluminous and imposed in so many different ways that compiling a comprehensive list is virtually impossible. Another measure of the reporting burden is the list of reports (variously described as studies, plans, reviews, certifications and

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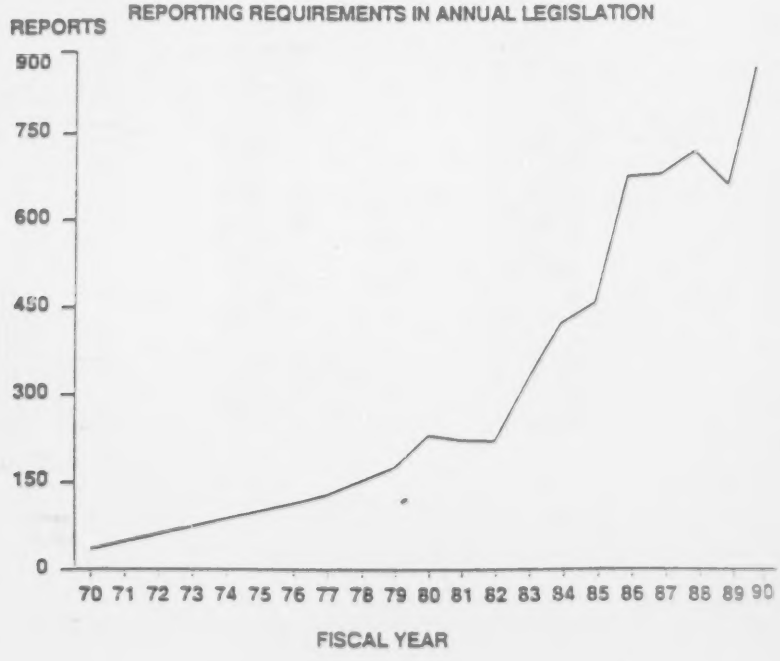
3. Presentated in this format by Walter Olson

reports, but referred to here simply as "reports") required by annual legislation and accompanying committee and conference reports compiled by DoD, most of which are not included in the Clerk's compilation. In 1970, at the height of the Vietnam War, the annual funding bills required only 36 such reports from DoD. In 1988, 719 were required, an increase of almost exactly 2,000%. From 1982 to 1987 alone the number more than tripled. While the number of new requirements declined for the first time in 1989, growth resumed in the 1990 budget cycle, reaching a new high of 861. Reporting requests in the House Armed Services Committee's reported authorization bill increased by over 100% over last year even before more reports were added on the House floor.



While there is a small amount of double counting in these measures, the trends and order of magnitude remain accurate.

B. Congressional Program Intervention

Below the level of general policy, Congress frequently imposes specific requirements on individual programs or activities. This White Paper refers to this practice as program intervention. Program intervention often occurs in report language or in non-codified statutes such as general provisions, provisos and limitations. Intervention can also be exercised through budget adjustments, particularly those attributed to management or technical concerns, or additions which do not address valid military requirements. Committees, members and staff also issue instructions on specific programs through letters or verbally. Although the Department is not required to comply with these forms of guidance as a legal matter, the consequences of ignoring such advice frequently compel compliance -- this year's ignored "suggestion" may become next year's statutory requirement.

The most common justification for Congressional intervention is poor program management. In fact, monitoring mechanisms which allow committees to review decisions or to second guess department actions are common, regardless of program performance, and their proliferation makes future intervention far more likely. Often, when specific directions are applied they generally have less to do with management issues than with funding allocation.

The experience and diversity of views represented in Congress can, when properly applied, aid in the development and management of specific programs as well as with broader policies. And obviously, when a program is troubled, external examination and advice can be helpful. The volume and scope of intervention, however, indicate a need to distinguish the circumstances and methods in which intervention can be helpful from those in which it is counter-productive.

1. Volume of Intervention

As with line item adjustments, Congressional intervention has grown significantly over a long period, but exploded in the 1980s. The seven hundred or so reports required in annual authorization and appropriation acts are usually coupled with program-specific requirements for which the report is an enforcement tool. Thus, the 2,000% increase in reporting requirements discussed above largely represents increased program intervention efforts. There are other indicators of the same problem. General provisions -- non-codified statutes which usually apply for a limited time -- have shown marked growth, increasing from 64 in 1970 to a peak of 236 in 1987, a 360% increase. Fully half of the pages in appropriations acts are now filled with this policy-type guidance.

A more comprehensive measure of specific Congressional directions to the Department is a report on "Actions on Recommendations in Congressional Committee Reports and Related Authorization and Appropriation Acts". The last such report, prepared in 1986, lists 1,024 specific requests and the Department response to each. Almost none of these are matters of general policy, and the total still excludes program-specific provisos and limitations included in the main text of the authorization and appropriations bills.

2. Types of Intervention

The variety of requirements levied on defense programs in bills and reports also demonstrates the pervasive nature of Congressional intervention.

Reports. Hundreds of simple reports (those not coupled with other requirements) are required each year in legislation and committee reports. While some reports are on broad topics such as arms control options, most are on specific programs, and are intended to force a review of an activity within DoD or to provide Congress with information to monitor or direct department activities. Congress also frequently requires reports which essentially

become binding on the department: 30 reports with schedules, performance criteria or funding plans were required in 1989. These are sometimes detailed blueprints for programs the Department may not support or need, but once a report is written it becomes the justification for future funding.

Funding earmarks. Congress approves broad categories of funding by statute and includes thousands of budget line items in its reports. Funding was earmarked even more restrictively within these line items in over 50 instances in the 1989 budget cycle. Many earmarks direct money to specific recipients, either by name or by virtue of conditions on the funding—in some cases with little direct relation to genuine defense needs. In other cases, earmarks represent mandates to spend funds on what are clearly low-priority items.

Structural requirements. Mandates ranging from detailed supervisory arrangements to management by a particular official to requirements for independent reviews are applied to dozens of programs annually. The intent is generally to force a review of decisions or a change in direction without an explicit requirement. Structural requirements are also imposed to guarantee a level of independence for favored organizations within DoD. Congress also encourages certain DoD organizations or officials to report directly to Congress without review by the Secretary of Defense or the President.

Minimum employment levels. Another frequent practice is the establishment of personnel, or workload, floors or requiring the continuance of specific functions at various installations. There are about a dozen such requirements in the 1989 defense bills with even more extensive requirements in permanent law.

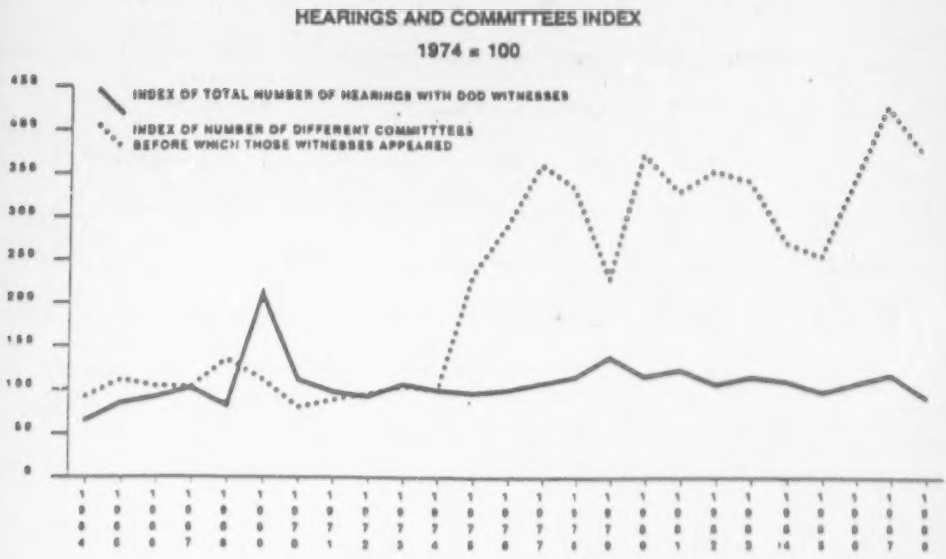
Technology limitations. Congress sometimes mandates the use of specific technologies or imposes binding performance or schedule requirements to "force" technology in research programs. The Congressional practice (not limited to defense) of allocating research funding

for political or geographical reasons is of increasing concern to the scientific community, and threatens to erode U.S. technological leadership.

Enforcement. Beyond the expectation that DoD will comply with statutory and report language, Congress imposes additional enforcement mechanisms such as funding fences (to be released after a specified action); certifications, review periods, prior notification, and outside audits, tests or cost estimates. The majority of the seven hundred reports required in annual legislation are enforcement mechanisms of this nature.

C. Committee Jurisdiction

The Defense Department has to contend with many more committees than the six with direct responsibility for its budget. In 1988, 14 full committees and 43 subcommittees or panels held hearings concerning DoD. Some 30 committees and 77 subcommittees claim some degree of oversight responsibility for DoD. The activity of "non-defense" committees includes policy initiatives which have an increasing effect on DoD. Oversight activity by committees other than appropriations and armed services soared in the mid-seventies. A GAO study requested by the HASC shows that while the number of hearings at which DoD officials testify has remained relatively constant over 25 years, the number of committees calling DoD witnesses more than doubled between 1974 and 1975, rose further the next year, and has continued at a level three times as high as before 1974.


HEARINGS AND COMMITTEES INDEX
1974 = 100
INDEX OF TOTAL NUMBER OF HEARINGS WITH DOD WITNESSES
INDEX OF NUMBER OF DIFFERENT COMMITTEES BEFORE WHICH THOSE WITNESSES APPEARED

Another trend of increasing consequence for DoD is the regulation of federal agencies and activities by other federal agencies or even states. This can impose costs or force changes in Department activities without regard to the overall defense picture. For example, the House Armed Services Committee 1990 authorization report says that compliance with environmental legislation will cost DoD $5-$10 billion over the next five years. "Unless extraordinary measures are taken to increase defense expenditures, provide for large transfers of funding within DoD appropriations or constrain environmental funding requirements, defense readiness and quality of life programs will have to be sacrificed," the report says. The Department is pleased to see the committee taking such a strong interest in this issue. Congressional decisions would have been much better informed, however, if the House Armed Services Committee had been permitted to play an active role as the relevant environmental laws were drafted.

Environmental laws are only one kind among several that are passed without the participation of the Armed Services committees even though they impose substantial direct or indirect burdens on DoD. As the largest civilian employer in the government, DoD's performance is strongly affected by compensation and ethics laws, but the defense authorizing committees are not usually given an opportunity to take DoD's particular needs into account while legislation in these areas is being crafted. Similarly, the department is responsible for well over half of all federal purchases, but procurement process bills are heard by the House Government Operations and Senate Governmental Affairs Committees without referral to Armed Services.

## III. FACTORS CONTRIBUTING TO THE DETAILED AND OVERLAPPING REVIEW PROCESS

Aspects of the budget and policy process which present problems for defense management represent opportunities for individual Members of Congress. The hours of debate, and stacks of amendments offered during House and Senate floor debate, say something important about the stakes and the interests involved in the defense debate. Defense consumes one-fourth of the federal budget, but represents two-thirds of discretionary spending (expenditures that can be altered without changing an underlying statute.) Members want to bring something home to the district, or to claim credit for sponsoring a useful program. Federal deficits make it tough to find new funds for programs, so the allure of controllable money makes the defense budget hard to resist.

DoD's proportion of the discretionary budget leads to reluctance to pass the Defense Appropriation bill until other appropriations are done. In 1989 the Defense Appropriation was signed eight weeks into the new (1990) Fiscal Year. In every other non-election year since 1979, the defense budget has been enacted at least two months after the start of the

fiscal year. In other words, half of the time the defense budget goes to Congress in January and takes the whole year to finish. The fact that the adoption of one budget and the submission of the next are commonly separated only by the length of the winter holidays contributes to a lack of conclusiveness in the Congressional defense process. If next year's budget debate is only a few days from the end of this year's debate, there is no reason to accept a negative decision as final.

No member of Congress wants to explain to constituents why a defense plant or base closed. It is much safer politically to stretch programs out by slowing down the rates of purchase, and thus keep plants operating. The politics of spending $100 million on each of two programs, therefore, are very different from the politics of spending $200 million on one and nothing on the other. And spreading the disputed $100 million cut over a dozen or so programs is even more palatable. Since these practices are more costly in the long run, however, Congress often delays decisions and forces itself to stretch funding further each year.

Even in the past two years, when administration budget submissions matched defense totals in the Congressional budget resolution, thousands of alterations in budget line items have continued. The invasive tinkering is the result of a committee process which begins with the collection of members' requests for added spending. The acceptable items are totalled and staffers are given a "bogie" -- an often arbitrarily-determined amount they must find in their portion of the budget to cut -- to pay for the new items. Large programs (frequently strategic), those which lack constituencies (such as spare parts or data processing equipment) and politically or technically troubled programs become the politically easy targets for cuts. Money from those programs can then be used to fund "bogies", and save programs which have considerable political support. If all else fails, a "general reduction", ordering the Department

to reduce spending in unspecified accounts, is applied. While major issues are reviewed in committee and on the floor, almost all line-item changes are produced in this committee process. In fact, since line items are contained in committee reports and conference explanatory statements, they are subject to amendment on the House and Senate floors only in an indirect fashion.

Intervention in individual programs through report language or statute can be an even more refined method of serving constituent interests. It is of little use to a member to increase a program's budget, only to see a competitor take the contract away from his district. Skillful use of legislative conditions can deliver money and jobs as surely as writing a check. The motivation for all of this activity was stated succinctly by Senator Ted Stevens: "Congress has made the defense bill a jobs bill."[4]

The political incentives for non-defense committees to exercise authority over DoD are similar to the ones that drive budget practices. When direct spending is constrained fiscally, Congress tends to substitute regulatory policy initiatives to promote various goals. The costs of these initiatives are borne either by the private sector, or by other government agencies whose spending is not counted -- if it can be accurately counted at all -- against the spending limit the budget resolution sets for the originating committee. The expansion of state authority to assess fines and to order DoD to undertake clean-up activities in preference to expanding direct funding of federal environmental activities is a prime example of this phenomenon.

At the same time, a diffuse policy process allows Members to go on record in support of conflicting goals. When DoD environmental policy is set by non-defense committees,

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4. Quoted by Mackubin T. Owens in "Congress' Role in Defense Mismanagement", Armed Forces Journal International, Apr. '85, pg. 94.

members can be 100% for the environment and 100% for defense without ever having to address the trade-offs and priority choices necessary to pursuing these and other goals in the face of limited resources.

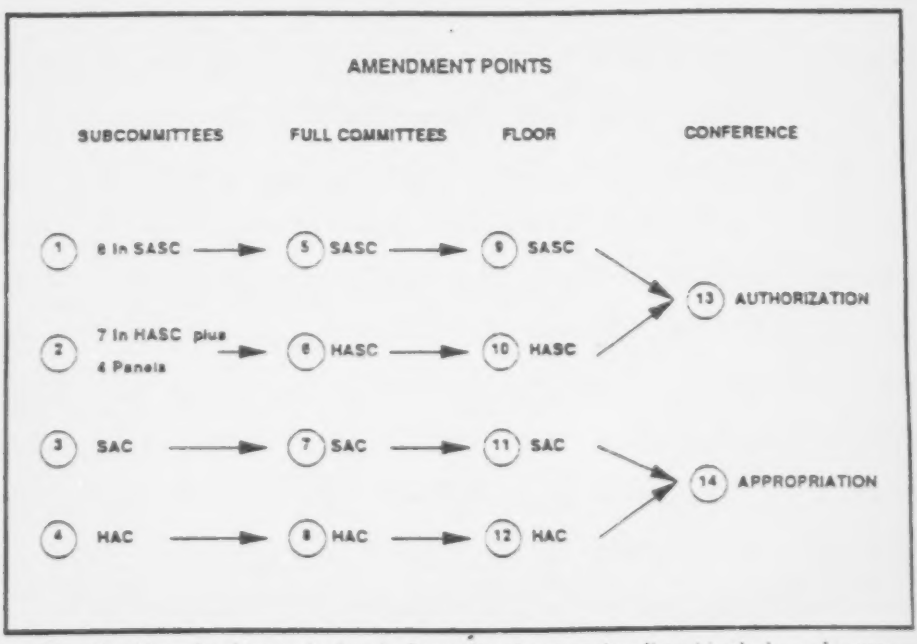
The desire of each member to be able to advance constituency or policy goals has the effect of pushing committees into competition with one another, driving the defense committees in particular into deeper and deeper levels of detail in an effort to assure a preferred outcome. For example, this year the authorizing and appropriating committees took different approaches to limiting defense outlays, which are the yardstick under the Gramm-Rudman-Hollings process. Though not required to match the outlay limitations of the budget resolution, the authorizing committees feel compelled to do so because otherwise they would place some major priority choices exclusively in the appropriations process. Consequently, the Armed Services committees changed their approach to outlays at the conference stage. The result was an almost complete budget review at the end of the process, making earlier labor largely irrelevant, and driving the committees to an even larger number of line-item changes.

A final, critical factor affecting Congressional defense oversight is a profound lack of trust. Doubts about the competence of DoD managers result in micromanagement. Distrust of the Department's willingness to comply with Congressional guidance leads to a proliferation of oversight and auditing mechanisms. Regardless of the origin of or justification for these attitudes, the legislative responses have led to unintended consequences affecting DoD management and efficiency. It is incumbent on Congress and the Department to work toward a more cooperative relationship.

## IV. CONSEQUENCES OF THE CONGRESSIONAL DEFENSE PROCESS

### A. Overlapping and Conflicting Mandates

With so many line-item changes, it is obvious that the authorizing and appropriating committees are often dealing with the same items on roughly the same level of detail, often at about the same time. A single program's budget can be adjusted in at least 14 points in the annual legislative process, not counting the budget resolution, and can be voted on even more frequently.




Despite this redundancy, the level of coordination remains disturbingly low. In past years, the committees have had running disputes about what the Armed Services Committees have considered to be unauthorized appropriations, the practice of funding projects which are not authorized or appropriating funding above the authorized level. In 1986, the divergence at the line item level between the final authorization and appropriations bills was $6.5 billion.

The dispute between the committees was not settled until 9 months into the fiscal year, effectively denying DoD access to a large portion of its budget for three quarters of the year.. While the size of this problem has been reduced in the past few years through informal arrangements, the cause of the problem -- an internal Congressional dispute over the relationship of the authorization and appropriation -- remains unresolved.

If the Department were to ignore the desires of one committee in favor of another, offended legislators might take actions to render funds obligated useless, or seek other retribution. The unresolved disputes between the authorizing and appropriating committees place DoD in a difficult position, one which can be detrimental to an effective national defense policy, but which cannot be solved by the Department.

In addition to the problems this situation creates for planning and efficient management, the Department sometimes receives contradictory mandates from the two different statutes. Inability to settle such disputes can delay needed modernization, waste resources and divert the attention of policy makers from other critical issues. Remarkably, such disputes persist despite lengthy and contentious review of both bills on the House and Senate floors. Congress frequently passes (sometimes within weeks of one another) authorization and appropriation bills with conflicting instructions.

Inconsistency in the application of general policies is a major feature of the Congressional defense process. The Department is urged to act more like a business, but is saddled with mandates that not only prevent business-like operations, but discourage private sector businesses from even dealing with the Department. Congress calls for procurement savings, but is unwilling to allow more multi-year contracts, or to eschew selective limits on competition. Congress endorses a mission orientation within DoD, but proliferates functional organizations. Cooperation with allies in procurement is alternately demanded and discouraged

The problem in each case is not that any of the conflicting goals are necessarily unreasonable in isolation, but that each is treated in isolation, while the effects are combined in defense operations.

The lack of integration among the different committees which impose mandates on DoD leads to the proliferation of statutory provisions governing defense activities. The Office of Technology Assessment's recent report on the defense technology base discussed the effect of overlapping and conflicting Congressional mandates, concluding that "while Congress did not intend the [defense acquisition] system to be slow, cumbersome and inefficient, laws passed to foster goals other than efficient procurement have made it so."[5]

B. Program Costs

Congress directed specific management actions in over 100 instances in the 1989 budget cycle. A review of the 42 most significant program requirements provides some measure of the cost and effect of Congressional intervention practices. These requirements increased costs in 75% percent of the programs, at a cost (combined with the costs of similar requirements on the same programs in prior years) of over half a billion dollars over the life of the affected programs. In only one instance was a schedule accelerated and savings realized as a result of these Congressional requirements.

The inconclusiveness of the budget process along with the political incentives to keep programs in production encourage program stretch-outs and other forms of program delays. According to a 1987 study by the Congressional Budget Office, a decision to decrease the rates of production by 50 percent would increase the real unit cost of most major weapons systems by anywhere from 7 percent to 60 percent, depending on the system. Producing at

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5. *Holding the Edge: Maintaining the Defense Technology Base*, OTA, April 1989, pp. 9-10.

higher rates allows for a more efficient use of the plant, machinery and labor and for bulk purchases of parts, components and materials.[6]

Congressional decisions often have beneficial effects. Such is the case with efforts to increase competition, which have resulted in large drops in price and improved performance. However, when Congress moves beyond simply mandating competition in appropriate instances, the results can be counterproductive. Instructions on how competitive bids are to be judged can have the effect (and purpose) of favoring one competitor or class over another, reducing management options and increasing costs. In some cases different rules are applied for making awards and paying for work, which can result in contracts being awarded to higher-cost suppliers. Unfortunately, prohibitions or restrictions on competition are far more frequent than Congressional efforts to promote competition, especially for items already in production.

C. Operational Implications

In addition to imposing costs on defense programs, the Congressional process significantly affects routine DoD operations. The most significant casualty is the ability to plan.

1. Instability

The instability fostered by Congressional alterations of the majority of budget items, frequently after the fiscal year has begun, greatly hinders planning and efficient management. With as many as 60% of line items changing each year, stability for individual programs is the exception rather than the rule. Committees have sometimes eliminated or sharply cut a program in one year only to increase it in the next. It is not very hard to find programs that

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6. *Effects of Weapons Procurement Stretch-Outs on Costs and Schedules* [November 1987].

have been changed every year. The multi-warhead Peacekeeper (or MX) ICBM is a classic example, but instances also abound among less visible programs. Furthermore, reductions for such functions as data processing equipment or pay costs cut across budget accounts. Adjustments of this type effectively mean that every DoD activity has its budget altered by Congress every year.

Beyond instability in individual programs, the vagaries of the overall budget process make even next-year planning difficult. DoD begins to formulate its budget well over a year before it is to go into effect. The budget resolution for the fiscal year starting in several months may have been passed, but the authorization and certainly the appropriation are still months away. This budget resolution does include a defense spending figure for the following year, but likely changes make it difficult to accept that sum as guidance for defense spending plans. The only time in recent history that the budget resolution's figure for defense spending in the second year was adhered to was in FY '89, following the budget summit agreement. Even then, the lateness of the summit agreement required a last-minute revision of the 1989 budget, and the bi-partisan agreement for FY '90 required adjustments in the spring, six months behind the normal schedule. Thus, the exigencies of the budget process have required DoD substantially to revise its budget four times in the past two years. Further, frequent tardiness in budget approval forces DoD to make adjustments very late in the internal budget process to account for Congressional actions.

Several factors complicate the effect of Congressional budget alterations on DoD. The entire defense budget is considered to be discretionary spending, and therefore subject to detailed review. Most other agencies have entitlement or formula-based programs which escape line-item review. Also unique to DoD, is the lag between obligations and outlays in many defense activities. For most agencies, commitments are made and money is spent in the same

year. For some defense items, such as aircraft carriers, the gap can be as long as five years. Only about half of the funds appropriated (budget authority) to DoD in any given year is actually spent (outlays) that year. For most other agencies the figure is above 90%. This is a problem because the Congressional budget process focuses on outlays, and half of DoD outlays are essentially uncontrollable in any given year, even though all of its budget authority is controllable. That means that cuts in defense budget authority must be much more severe than cuts in other agencies to produce equivalent outlay savings, since each dollar cut produces only 50 rather than 90 cents in savings. The practical effect is to force defense committees to cut salaries and operating expenses, which are reflected in outlays immediately, and to preserve or increase procurement funding, which spends out at a slower rate. Unfortunately, that only makes budget cuts more difficult in future years.

Even more damaging are the perverse incentives the budget process presents for defense contractors. As former Secretary Carlucci noted in discussing the Ill Wind scandal:

> If you are a defense contractor, and looking at how you would make your investment, and you look at the instability in these programs...and your choice is making your investment in long-term productivity enhancing equipment to try to get unit costs down and improve quality, or intervening in the political process..., either in DoD or the Congress, you are most likely to come to the conclusion that political intervention is the best use of your resources.[7]

**2. Fostering Divisions Rather than Integration within DoD**

Another result of the Congressional defense process is the reinforcement of divisions within DoD. This was cited as a "fundamental problem" in the SASC staff report on defense

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7. Testimony before the Senate Armed Services Committee, July 12, 1988.

organization, having five aspects. First, the report said, the different operating styles of oversight committees "tempt factions within DoD to export conflicts to Congress". In addition, the report criticizes Congress for: its focus on accounting inputs rather than mission outputs; its failure to make program and policy trade-offs across Service lines; its focus on policy or program conflicts within DoD; and, its predilection to favor "independent subordinate offices as opposed to centralized control in DoD, in order to maximize its leverage" in resource allocation or as a referee in policy disputes.[8]

This is not an accidental feature. Congress encourages every official to see committees as "friends" to whom they can come if they have "problems". In the words of a HASC staffer, "...it is not difficult for the Services to receive a sympathetic hearing about the 'shabby treatment' they have suffered in the executive branch budget cycle....It would be difficult to overestimate the contribution to the committee's overall effectiveness that results from this natural and enduring alliance with the Services."[9]

This effort to divide is an enduring aspect of Congressional defense policy. It strongly influenced decisions in the creation of the Department of Defense in 1947. The lack of coordination within DoD in both operational and acquisition matters is due in part to Congressional insistence on highly independent structures within DoD. Mandates to increase jointness or to centralize acquisition will have little enduring effect if Congress continues to insist on strong structural divisions.

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8. "Report on Defense Organization," Senate Armed Services Committee, United States Senate, GPO, 1988, pp. 582-3.
9. Michael A. West, "The Role of Congress in the Defense Budget Process: A Positive View" Naval War College Review, Vol. XXXII, Number 3 [May-June 1979], pg. 92.

3. Inflexibility

Though Congress can sometimes respond more quickly than a bureaucracy, Congressional power is frequently inflexible. Changing a statute is more difficult than changing a regulation, not only because the opportunity to do so comes but once a year, but because special interests can more easily block legislation. As a result, the typical Congressional response to a problem (frequently related to an existing statute) is a demonstration project, limited in time and scope and bound by reporting requirements. Congressional insistence on detailed control of the budget is inherently inflexible as well.

D. Work Load

To support an increasingly duplicative and detailed annual review Congress has imposed an ever growing workload on the Department. The cost of justification books and reports represent direct burdens in support of the Congressional budget review. The average report takes about 1,000 hours to prepare and costs about $50,000. The Department is required to submit over 1,000 separate reports to Congress annually (up to 700 in annual legislation and several hundred more due to permanent requirements) at a cost of over $50 million and representing the equivalent work product of over 500 full time employees. Many of these reports do ask important questions, but with such a great volume it is all but impossible for the staff, let alone the Members, to put the flood of information to good use. As Senator Nunn noted in supporting elimination of two-thirds of DoD's recurring reporting requirements, "you can justify one report after another on an individual basis, but when you add them up, the cumulative total of the kind of paperwork required of the Department of Defense is intolerable."[10]

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10. Debate on S. 2295, Goldwater-Nichols Department of Defense Reorganization Act, May 7, 1986, *Congressional Record*, Vol 132, Num. 60, pg. S 5496.

The large number of Congressional audits also represent a substantial direct burden on the Department. The House Appropriations Committee Surveys and Investigations staff conducts over thirty investigations in an average year. The General Accounting Office (GAO) spends nearly 30% of its total resources (and an even larger portion of audit time) on defense-related work, an investment of over $100 million per year. There are between 400 and 450 GAO audits of DoD activities each year, and an even larger number of reports. These congressional audits require the time of approximately 400 DoD employees on a continuing basis.

A variety of other Congressional contacts also impose substantial burdens on the department. In 1988 over 245,000 hours were spent responding to nearly 18,000 Congressional letters [relating to acquisition issues alone]. [Amended 4-2-90.] In 1984 (the latest year for which data are available) there were 599,000 telephonic inquiries from Congress. The Department presents well over 1,000 briefings to members and staff each year. Senior Department officials spend an average of 3,000 hours per year preparing for and presenting testimony to Congress.

E. Opportunity Costs

The issues that are left off the agenda are at least as important as the more obvious costs of the Congressional focus on short term decisions. Legislative-executive deliberations focus almost entirely on specific weapons systems as opposed to national defense strategy because that is exactly what the process encourages. There is literally no extended period when Members of Congress or the Administration are able to consider issues free from the pressure of passing the fmmediate year's budget. If a different perspective is needed, a different process would be more likely to bring it about.

The recently retired Chairman of the Joint Chiefs of Staff has cited Congressional requirements as one of the primary frustrations of his job, leaving him little time to consider military strategy or other major issues. Even for the Commanders-in-Chief, the Department's primary operational officials, large blocks of time are consumed by budget preparation and testimony. This involvement necessarily detracts from their primary mission. The solution for the CinCs, and for other participants, is not to limit their influence on the budget, but to enhance it by incorporating their advice into longer-term decisions on major issues.

The time required by budget matters is a source of frustration for members of Congress as well: "We no sooner finish grappling with this beast in November or December, then we must start all over again in January."[11] In the words of one Member: "the Congress guides our defense strategy by the budget, rather than the other way around as the Pentagon would have it."[12] In one Congressional staffer's account: "the Members of the committee back into policy. We debate policy when we attack or support specific weapons systems, but it should be the other way around. We should debate policy first and then determine which systems to procure."[13]

In summary, the current Congressional defense process is characterized by a multiplicity of actors, frequent decisions, lack of finality, disintegration and lack of accountability. The focus is on details at the expense of broad policy, functions at the expense of missions, and accounting inputs at the expense of results. Many in Congress, in DoD and outside the government have expressed frustration and a desire to fashion a better process.

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11. Nunn, Comm on Comm sys, pg. 65.
12. Wilbur Jones, pg. 49.
13. "Congress and the Defense Budget," pg. 414-5.

## V. RECOMMENDATIONS

The previous discussion set forth some ways in which the Congressional process hurts defense management. Because that process evolved to serve members' interests, suggestions for change must also accommodate those interests.

Fortunately, there is a growing recognition within Congress of the problems caused by the current defense process. As noted above, the Armed Services Committees, in particular, have already taken steps to address some of these problems. Both Committees have supported two-year budget submissions, milestone authorizations and multi-year procurements. The Senate Armed Services Committee in particular has made a conscious effort to reduce the amount of detailed program guidance, reflected in a reduction in the length of committee reports and in the number of line items adjusted. The SASC has also moved toward mission-oriented subcommittees and annual strategy hearings while the House Armed Services Committee has established panels to examine major policy issues. The HASC has worked with the House leadership to limit debate time and the number of floor amendments to the defense authorization. The recommendations below include several options for change in the budget process, committee jurisdiction and other matters. In concert with these reforms, indeed to make them possible, efforts must be made to foster trust between DoD and the Congress.

The primary objective is to produce stable decisions that allow for planning based on strategic objectives. Stability is critical in both acquisition and policy matters, and a stable process would promote efficiency in individual programs as surely as it would improve overall policy and resource allocation decisions. Encouraging each of the major participants to concentrate on their respective strengths would promote stability. Party leaders can play an enhanced role in facilitating long-term budget agreements and cross-committee cooperation.

Authorizing committees should leave line-item budgeting to the appropriators. In turn, the appropriations committees should adhere to major resource allocation and force design (structure and weapons systems) decisions made in the authorization process. The executive branch should be given greater flexibility in executing budget and policy decisions.

In some ways, these changes would make Congress a more serious, more formidable adversary when it disagreed with an administration. But by shifting the debate away from issues that ought to be left to the program managers, toward something the public might care about and understand, the Congressional process could facilitate, instead of impeding, the development of a publicly supported, national consensus about strategic objectives.

**A. Take Steps to Re-establish Trust**

Re-establishing trust between DoD and the Congress is a fundamental precondition to specific steps to improve the relationship. The process of reestablishing trust will be an extended one. There are some simple steps, however, that might allow the major Congressional and administration players in the defense process to forge better working relationships. The fact that all of the parties are continually overwhelmed by budget details, which are often natural points of antagonism, militates against the nourishment of productive DoD-Congressional relationships. Broad agenda meetings between Congressional defense leaders and senior DoD officials have been praised as useful by all parties and should be considered to re-establish trust.

**B. Lengthen the Time Horizon of the Budget Process**

A biennial budget cycle would encourage a greater division of roles, more stable decisions, and a better planning process. The Department, the Packard Commission and the politically broad, blue ribbon Defense Organization Project of Georgetown University's Center for Strategic and International Studies have all supported this concept. In 1986, the year of

the Packard Commission's report, Congress directed the President by law to submit a two-year budget for fiscal years 1988 and 1989. The President followed the congressional mandate, and a two-year authorization was approved, but Congress remained with a one year appropriation.

The 1988-89 experiment resulted in improvements in program stability and programmatic and policy oversight. Despite adjustments necessitated by revisions in budget totals, line item changes were cut approximately in half due in part to the biennial submission. Unfortunately, problems in the appropriations process and other issues make the biennial budget unlikely to be implemented in the near future.

As a first step toward a longer time horizon for the budget, Congress should consider a two year budget resolution, in which spending limits are set for the budget's major functional categories for two years, but the details are left for annual determination. Congress adopted a two year resolution at the end of 1987 for Fiscal Years 1988 (which had already started) and 1989. Because the agreement was forged by congressional leaders and the President, the numbers held up for Fiscal Year 1989. Knowing the top line in advance permits the executive branch to plan, and to establish its own priorities, more thoughtfully. In addition, because an early agreement makes for a more orderly congressional environment, and because such an agreement presupposes a major role for the party leaders, it should be in the interest of the party leaders as well as the President to explore whether the experience can be repeated and made regular.

### C. Focus the Authorization Process Away from Budget Lines

Before the authorizing committees are willing to move away from a focus on budget line items, they must see that they can exercise a different, broader form of oversight. To achieve this objective, the authorizing committees would have to (1) shift away from an annual

review of all procurement programs, (2) drastically reduce the number of line items in the research and development budget, and (3) change the language of the authorization statute to authorize programs instead of the same budget functions as are used in appropriations bills.

This change in format would be part of a broader shift in direction in which the authorizing committees would not review each program every year. In development and procurement, authorizations should occur at the major milestones until the program is ready for full-scale production. At that point, multi-year contracting should be the norm. Any one year's authorization, therefore, would include only those programs ready for a major milestone or for a multi-year contract.

Both of these practices increase program stability and therefore save money. The 58 multi-year contracts approved by Congress between 1982 and 1989 will save $9 billion, compared to annual procurement. In addition, to the extent these practices can be extended and the number of line-items needing annual review can be decreased, time will be freed to permit movement toward a broader form of oversight helpful to the long range interest of all participants.

Elimination of the annual procurement and development authorizations would make it much more difficult to fund unauthorized programs, since programs would be authorized individually rather than in categories such as "Aircraft Procurement, Air Force" as is currently the case. With the stability engendered by a two-year budget resolution, the authorization committees could tailor authorized totals fairly closely to the amount of funds likely to be available. A reconciliation-type process might be used within the committees to make room for new programs or to adjust to annual funding fluctuations.

There are also some less radical steps Congress could take to reduce instability and save money. The move toward multi-year contracts is a good example. At present, however,

multi-year contracts have to show savings of at least 10% compared to a series of annual contracts. In an era of multi-billion dollar programs, it is difficult to justify rejecting even small percentage cost savings. Elimination of this threshold and expansion of milestone authorizations for research and development programs would be helpful first steps while working on the larger issues.

D. Budget Submissions Should Reflect Missions and Forces

Another method of reducing the level of detail in annual authorizations is to change the content of budget submissions. One of the impediments to a productive executive-legislative defense policy dialog is the set of budget categories mandated by the Congress. These do not focus on defense force structure (e.g., F-15 squadrons, carrier battle groups) which in turn can readily be presented in terms of mission and regional allocation. Instead, budget categories focus on inputs -- individual planes, spare parts, fuel, maintenance, personnel, and so on. At the highest level of aggregation are the budget titles: Military Personnel, Operations and Maintenance, Research and Development, Procurement, Construction. At the lowest level of aggregation, the content of each title is different. For O&M it is element of expense; for Procurement, it is hardware line item; for Construction it is the individual project. In this situation it is not surprising that policy debates often break down into parochial squabbles over specific inputs and who benefits from them. That is the structure of the budget as Congress mandates it be submitted; that is the structure of the budget as enacted; and that is the budget structure that the Department of Defense must use in monitoring execution.

But the structure can be changed if the Congress is willing. The Department is ready to consider new structures that would focus clearly on forces, missions and regional allocation, and thus on the choices involved in defense policy. While DoD has long used categories like this on its own (and shared some with the Congress), existing categorization systems are

imperfect. More important, as long as inputs form the basis of the legal budget, in the executive-legislative debate interest in broader concerns will always take a back seat to inputs. The Department is ready to put measures of defense capability in the front seat, and would welcome the chance to do so in partnership with the Congress.

One suggestion which moves in this direction is to fund major equipment in packages which include all associated support equipment, spares and maintenance. This would clarify the costs of decisions and result in a more balanced defense program. Ideally this shift would be made by revising budget lines to reflect whole programs, rather than various hardware and operations elements. Alternatively, committees could consider a limited number of programs in this fashion and distribute funding in existing appropriations categories after decisions are made.

**E. The Department should work with Congress to reduce level of detail in budget material**

Without a reduction in the volume of required reports, line-item changes, and justification material, the tyranny of the annual budget review will continue to prevent the development of a more rational oversight process. Unfortunately, after a brief leveling of reporting requirements and line item adjustments in the past two years, all measures of Congressional defense activity show renewed growth at this stage of the fiscal 1990 review. Fortunately, this is an area in which Congress has recognized a problem, and many in Congress are willing to work with DoD to reduce burdens and shape a more rational oversight process.

The Committees should consider a self-imposed limit on the length of their reports or on the number of actions required of the Department. This would require members and staff to focus on the most critical issues. While DoD would have more flexibility in areas not addressed, its responsiveness to Congressional input would be improved on the issues remaining. However, DoD must respond aggressively to Congressional openings. Specifically,

we should renew the effort to provide suggestions for elimination of recurring reports as requested by Congress in the Goldwater-Nichols Act. Three efforts to respond to this request have floundered since 1986.

A major weakness in past efforts in this area has been the treatment of reports as if they were cost-free. A series of "Congressional Reports Elimination Acts" ended in the early 1980s, in part due to GAO criticism that agencies had not properly determined the utility of reports to the users (Congress). The point of criticism about the reporting burden is not, however, that reports are totally useless, but that the aggregate burden is unacceptable. Further, the utility of each individual report is greatly reduced by the tremendous volume.

Report managers should be given guidelines to balance information needs with resources, rather than asking "is this report useful?" for each in isolation. Report authors are not in the best position to balance costs and benefits. Their viewpoint is limited to a tiny portion of the problem, and may be clouded if the reports at issue represent a large portion of the office or personal workload (and consequently justify the position or organization). The Department should suggest that Congress judge revisions in the same manner: agree beforehand to achieve a set cost or time reduction, and set priorities for which reports should be deleted, combined or retained. Even a successful effort of this type would solve less than half the problem, however, since a majority of DoD's reports to Congress are required by annual legislation rather than on a recurring basis. Restraint on the part of the defense oversight committees, perferably through self-imposed formal guidelines, is the only way to address that portion of the reporting burden.

In a similar manner, the Department should work with Congress to review budget justification material, with the intent of greatly reducing its overall volume and eliminating marginally useful exhibits.

**F. Track the costs of Congressional requirements**

Reform efforts have been hindered by the fact that the costs and effects of the Congressional defense system are difficult to measure. A major contribution DoD can make to reform is to present to Congress and the President further evidence of problems caused by Congressional oversight practices. Department managers have been reluctant to do so in the past for fear of offending Congress, and because features of the current system serve the perceived interests of many elements within DoD.

A relatively simple step to aid in measuring oversight burdens would be to include cost estimates in Congressionally-required material. Such estimates should not be more complicated than those used for Freedom of Information Act requests. Including estimates of time and costs in transmittal letters for required reports would be a logical first step. Costs for recurring reports might be estimated annually or at some other interval rather than for each submission. Costs for preparing budget justification material should also be estimated, both on an aggregate basis and for large discreet elements. Finally, cost estimates might be included in replies to letters or other requests which require a substantial or unusual effort.

**G. Revise the Rescission Process**

One concern with leaving line-item funding to the Appropriations Committees is that these committees do not play as large a role in budget reduction efforts as they did before the 1974 Budget Act shuffled responsibilities.[14] This situation can be balanced by giving the President greater rescission authority than he now has. Under present law, the President sends a rescission message to Congress, but the rescission does not go into effect unless Congress affirmatively adopts it. If Congress ignores the message, silence kills the rescission. We

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14. *Congress and Money* [Washington: Urban Institute, 1980], p. 441.

would prefer to see rescissions structured like arms sales under the Arms Export Control Act. Under that act, a sale is considered approved unless Congress rejects it within a specified time period -- just the opposite of the rescission presumption. If reversing the presumption is not politically feasible, Congress at the very least should be required to vote on a proposed rescission. With a required vote, at least the most egregious special interest provisions could be surfaced for public attention by the President.

Unfortunately, trends in the related area of reprogrammings are moving in the direction of requiring more detail. Formerly, DoD was allowed to move ("reprogram") small amounts of funds among accounts to meet changing needs without notifying Congress. The Appropriations Committees recently insisted on new procedures for DoD to aggregate low level reprogrammings which were not formerly subject to Congressional review and to require that any reprogramming that has the effect of terminating a project, no matter how small, must be approved in advance by the committees.

**H. Better Integrate the Multiple Policy Goals of Congress**

Several commentators have described the American system as one of shared rather than separated powers.[15] Congress will never remove itself totally from administrative matters. However, Congress could do a better job integrating the many different ways in which its multiple organizational units can impose conflicting requirements on the same organization in the executive branch. It would be particularly useful for Congress to address the goals unrelated to national security which are imposed upon the Defense Department. It is clear that Congress and the American people expect DoD to do more than simply provide an efficient

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15. See Abraham Sofaer and Louis Fisher in L. Gordon Crovitz and Jeremy Rabkin, Eds, *The Fettered Presidency*, AEI, 1989.

defense structure. Accountability, equity, honesty, attentiveness to disadvantaged areas and persons and environmental responsibility are all aims which are and ought to be incorporated into defense policy, programs and operations. Imposing absolute requirements in these areas, however, is tremendously costly. A process which explicitly examines and balances these goals with the needs of an efficient defense effort would be more rational and probably better supported by the American public.

The Office of Technology Assessment report on the Defense Industrial Base suggested three general approaches to addressing this problem: totally replacing the existing administrative and statutory framework; a bottom-up review of all existing guidance; or, an evolutionary approach which reviews individual requirements as problems arise. The Department is conducting a bottom-up review as a part of the implementation of Secretary Cheney's July 1989 Defense Management Report to the President, and will present legislative requests to the Congress in the near future. This presents the opportunity for Congress to address problems in an evolutionary framework. In general, however, Congress and particularly the Armed Services Committees should examine statutory proposals in the most comprehensive framework possible, and avoid, as the House did this year, piecemeal approaches to acquisition or other legislation. The Committees might consider, for instance, reviewing major portions of Title 10 of the U.S. Code on a periodic, scheduled basis.

Since a number of statutory problems are in the jurisdiction of Committees other than Armed Services, the Leadership should be encouraged to use sequential or joint referrals for bills which affect DoD significantly. Joint committee hearings might be particularly useful in exploring the effects of various legislative proposals on DoD and in reconciling competing priorities before legislation is enacted. Whether there is a formal referral or not, the Department should make a point of keeping the Armed Services Committees informed of any

bill or proceeding in another committee that affects defense. DoD and the Armed Services Committees have a mutual interest in scrutinizing the effect of non-Armed Services legislation on the DoD. Hearing on the effects of existing legislation would also be useful. The House Committee reforms of 1974 included a requirement for each committee to file a report of its oversight agenda. This provision has had little impact so far. However, it would be in the interest of DoD and the Armed Services Committees to work together to develop such an agenda.

Changing the Congressional process will be difficult, but the alternatives are even less attractive. Congress has a choice. It can retain control over the details, while America loses its ability to stay ahead of events. Or Congress can expand its horizons together with the executive branch in a mutually beneficial way.

# NEWS RELEASE

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**IMMEDIATE RELEASE** January 11, 1990


## PENTAGON OFFERS PROGRESS REPORT ON MANAGEMENT IMPROVEMENTS

Top Pentagon officials today summarized "major cultural changes" in the way the Defense Department is run and in the way its purchasing system works.

Secretary Dick Cheney, Deputy Secretary Don Atwood, and Under Secretary for Acquisition John Betti described the changes when they presented a progress report on their efforts to improve management of the Defense Department. The officials stressed that the changes, made in accordance with the Defense Management Report, are achieving the results they envision.

The Defense Management Report was issued by the department in July 1989, five months after President Bush directed the Secretary of Defense to devise a plan to implement fully the recommendations of the Packard Commission, improve the performance of the defense acquisition system, and manage more effectively the department and its resources.

"The changes in the nature of the threat around the world, and the realities of the budget, mean that our defense budgets are going to be leaner in the years ahead," Cheney said. "So every dollar that we can cut out of the cost of running the Pentagon is a dollar we don't have to cut from force structure, readiness, or the quality of life for our men and women in uniform."

The management improvements are based on initiatives by the three service secretaries and several task forces working to comply with the recommendations of the report. These initiatives cover a variety of areas from reducing micromanagement to maintaining military strength while reducing overhead costs.

Atwood, who supervises the continuing work to implement the recommendations of the report, emphasized that savings will occur through management efficiencies and consolidations in the areas of logistics, administration, automated management information systems, base operations and facilities, and finance, procurement and contract management. Further efficiencies will be sought through a series of legislative proposals and policy changes.

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As Atwood outlined the changes, management will be improved by such initiatives as:

- Better control of supplies. The Army, for example, will streamline the Army Materiel Command. The Air Force will restructure its Systems, Logistics, and Communications commands. The Navy will reduce overhead costs in Naval shipyards, aviation depots, and other maintenance activities.

- Reduction in the use of consultants, outside advisors, and other contractually arranged assistance.

- Creation in each service of an acquisition corps of full-time experts, who will report through a streamlined chain of command to top department officials.

- Elimination of unncessary paperwork. A regulatory task force has reviewed more than 1200 self-imposed department directives and policy memoranda, 512 of them directly affecting the acquisition system. After reviewing 383 of them, the task force recommended elimination of 61, cancellation of 176, revision of 63, and retention of only 83. Also targeted for cancellation, cancellation and combination, or revision and reissuance are 274 of 431 Defense Federal Acquisition Regulations Supplement (DFARS) clauses; 52,450 of 66,665 lines of DFARS text; and 61 of 80 department/agency contract clauses.

The management improvements will generate $2.3 billion in savings for FY '91 and an estimated $39 billion through FY '95.

The improvements make it possible to trim the logistics and management workforce of 580,000 civilian and military personnel by as many as 8,000 civilians and 8,000 military personnel in FY '91 and by 18,000 civilian and 24,000 military personnel by the end of FY '95. These efficiency-related reductions do not include force structure reductions associated with the FY '91 budget.

"This is a dynamic effort that is moving on many different fronts," Atwood said. "We are making cultural changes in the defense environment by streamlining, reducing unnecessary duplication, improving lines of communication, and promoting smarter management." He added that he will continue to monitor the report implementation effort and will issue additional progress reports as necessary.

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# NEWS BRIEFING

Office of the Assistant Secretary of Defense
(Public Affairs)

News Briefing with
Secretary of Defense Dick Cheney
Deputy Secretary of Defense Donald Atwood
Under Secretary of Defense (Acquisition)
John Betti
On Defense Management Report
Thursday, January 11, 1990 - 11:00 a.m.

Mr. Pete Williams, ASD/Public Affairs: Good morning, ladies and gentlemen. We're here to offer you a progress report on the Defense Management Report. Secretary Cheney is here along with Deputy Secretary Don Atwood, and John Betti, who is the Under Secretary for Acquisition. Mr. Cheney and Mr. Betti will both have statements, so will Mr. Atwood. At the conclusion, they'll be happy to answer your questions.

We would ask you that because the topic here is the Defense Management Report, we realize you may have questions on other subjects, but we would ask you to let's get the Defense Management Report questions handled first.

Mr. Cheney?

Secretary Cheney: Thank you very much, Pete. As Pete mentioned, the purpose of our session this morning is to talk about the Defense Management Review and in effect give you a status report on it. I will, after we've completed the briefing and after there's been an opportunity to exhaust the Q&A on the Defense Management Report, I'll be happy to stick around and take your questions on some other subjects as well, but we'd like to focus on the DMR up front if we can, so I'd ask you to abide by those ground rules.

Less than a year ago the President directed the Department to come up with a plan for improving the way the Pentagon does business, specifically the way we make our purchases and the way it's managed. In July, Secretary Atwood and I talked to all of you about that plan, and in October the military services submitted detailed plans and schedules for meeting those objectives.

Last week Secretary Atwood, Mr. Betti, and myself, Sean O'Keefe briefed the President and received his strong endorsement for the proposals. Today, we'd like to bring you up to date on how we're doing in putting that plan to work. Don Atwood and John Betti, when I finish, will offer you a more detailed briefing, and we'll be here to respond to questions on the subjects.

We believe that we've got concrete, positive evidence to present that some progress is being made. We realize that for some of you this may not seem like dramatic news. Six hundred dollar toilet seats are sexy and easy to get people to focus on. The work of getting the Department of Defense to function in such a way so that we don't have $600 toilet seats is hard and complex, and involves a lot of nitty gritty detail, but it is extremely important.

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An institution the size of the Department of Defense is not changed overnight. The obligations that have been imposed on our employees over the years, both by Congress and by our own regulations, have piled up. Some of them are good, some of them add nothing but complexity and confusion. Changing them is a considerable task. But real changes are being made both by the civilian leadership and by the military services that we believe will improve Pentagon management and help make it possible for us to buy what we need at a lower cost, in less time, with greater assurance of quality.

I want to stress that the goal of the Defense Management Report is not simply to cut the budget. The changes we're making should lead to a more efficient system that can run with fewer people and greater accountability, and that will result in a system that costs less to operate.

In a few weeks, we'll be back to discuss the forthcoming DoD budget for fiscal year 1991, and we'll be able to go into even more detail at that time about the impact these management changes will have on our budget. For now, let me just offer you a few aggregate statistics.

In the 1991 fiscal year, which the President will present to Congress later this month, we expect savings of $2.3 billion as a direct result of the management improvements we're going to talk about today. And for the five years ending in 1995, the savings will total some $39 billion. Greater efficiency means we can run the system with fewer people. For fiscal year 1991, we expect to reduce our acquisition and related management work force by 8,000 civilians and 8,000 military personnel -- that's in 1991. This will be the result of a more efficient structure in the acquisition system and in the overall management of the Department. At the end of five years, reductions associated with those changes we'll talk to you about today -- those reductions will amount to some 18,000 civilians and 24,000 military personnel, or a total of 42,000 positions.

As I've said before, the changes in the nature of the threat around the world and the realities of the budget deficit clearly mean that our defense budgets are going to be leaner in the years ahead, so every dollar that we can cut out of the cost of running the Department is a dollar we don't have to cut out of force structure or readiness or the quality of life for men and women in uniform. The improvements we're here to discuss today are the results of a lot of hard work, especially by Don Atwood and John Betti. They also represent a commitment from Secretaries Stone, Garrett, and Rice, and the military departments to make this management review process work.

The good news is that the work has only begun. I expect future progress reports for you as we continue to make improvements in the way the Department goes about its business. But we cannot do the work alone. When Don and I were here with you in July to talk about this specific subject, we stood by two stacks of some 650 reports required each year by Congress, an average of two per day. Unfortunately, that problem has gotten worse. Based on the most recent set of authorization and appropriations bills, those passed for fiscal year 1990, Congress now requires us to produce 861 reports -- last year 650 plus reports, this year 861 reports. That's a third more than required just a few years ago.

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What I've got here is just a summary listing. It's 136 pages long. It's just a summary listing of all the reports we're required to submit to Congress in fiscal year 1990. The book itself is over 130 pages long. That's the listing of the studies that we have to submit.

You'll discover, for example, that the Department of Defense is required to conduct a study this year of the cost effectiveness of the advanced placement of Army helicopter pilot trainees from the University of North Dakota. That's an important subject. (Laughter)

I could go on, there are other examples. The point is, we're spending an awful lot of time and energy and resources doing work that has absolutely nothing to do with the safety and security of the United States. We're willing to do the painful work of cutting back at the Pentagon to make it leaner and more efficient, but we need the cooperation of the Congress. We want the remaining work force here doing the job of national defense, not simply answering Congressional mail.

I am impressed by the tremendous work that Don and John and others on the staff have done. They've done a first rate piece of work in terms of sticking to the commitments we've made in our management report to the President. At this point I'd like to call on Don Atwood to provide some more detailed information about the defense management process.

Secretary Atwood: Thank you, Dick. I've asked John Betti to join me too, because we're going to give just an informal presentation and then open it up to questions that you may have.

As you know, this is a progress report. It's a progress report on what has been accomplished since we talked with you last July on our plans to implement the recommendations of the Defense Management Report submitted to the President then.

Let me just take a minute and talk about the six general areas that our implementation plans follow. First and foremost, we're talking about reducing the overhead costs while maintaining the military strength. Although that sounds rather bland, it basically is addressing the concern that many, many people have, that the Department of Defense is too big, is too complex, it's too burdensome, and it's too bureaucratic to make significant changes in how we do business. I want to come back to that in just a minute.

The second is to enhance our weapons systems program performance. What that is saying is, we're addressing the deep concern that many people have that too many of our major weapon systems programs are overrun, they're late, or they're technically deficient, or some combination of them. There we've charged, under Secretary Betti, with the responsibility for disciplining that system, and I'm going to ask him to say a few words about that.

The third, is to reinvigorate the planning process. In this very dynamic world situation that we face today, it is all too easy to see and hear of dramatic changes that we're making or propose to make in our force structure

or our weapons programs. And it's all too easy for someone to make the accusation that it's being done without a detailed strategic plan. Nothing could be further from the truth. I want to talk for a minute about the things we're doing to make sure that we too, have a dynamic, strategic defense plan and that all of our actions are geared to that.

The fourth is to reduce micro-management, and that's an area that needs no amplification. We're talking about micro-management of Congress on the Department, but also of the Department on itself and on its contractors, and we're taking definitive steps there to ease that situation.

The fifth is to strengthen the defense industrial base. In that regard, we're talking about the fact that all too often we hear that major reputable firms in this country do not want to do business any longer in the defense industry. They either are trying to sell their businesses or they're trying to withdraw from the defense business and convert to commercial. If we are to maintain a strong, flexible, viable defense industry so essential for the security of this country, we have to be sure that reputable, straight forward companies want to continue to do business with us.

Finally, we have to go about improving the ethical standards, both within the government and within industry. We'll talk a few minutes about steps of each.

Relative to the reduction of cost, and relative to doing a fundamental change in the cultural outlook of the department, we're streamlining organizations, we're going to reduce redundant personnel, we're going to eliminate unnecessary, non-value-added functions, and we're going to increase the accountability for our costs. As Secretary Cheney said, we envison over the next five year period the costs that we have defined already that can come out of this process are approximately $39 billion, a significant amount.

You might ask for a couple of examples on what do you mean, how are you doing this? Let me just say this. About half of that comes out of changes that we're making in the logistics process and in the acquisition process -- reducing costs for supplies, for repairables, for clothing, for transportation. Streamlining and restructuring the Army Materiel Command, the Air Force Systems Command, the Air Force Logistics Command, and maybe shipyards, aviation depots, and maintenance depots. Nearly one-half of the cost associated with that $39 billion comes out of those specific actions.

In addition to that, we're reducing our administration costs. The Army Information Systems Command, the Air Force Communications Command, the Navy Secretariat and the Navy Laboratories. We'll take out nearly $3.7 billion over the next five year period.

These are just two examples of the kind of steps that we're taking. It is an ongoing process, continuous improvement which we believe as we go on, and we'll report back to you in another progress report, that indeed we can increase that amount of $39 billion.

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Relative to the second challenge, I mentioned that too many of our programs appear to be overrun or late or technically deficient, and we charged the Under Secretary for disciplining that system and making some fundamental changes. I'd like to turn it over now to John Betti and let him tell you about some of the things we're doing there.

Secretary Betti: Good morning.

What I'd like to cover in terms of enhancing weapon systems performance and getting discipline back into the system really stems from the Packard Commission and a number of reports that went on before that. The fundamental problems were pretty well spelled out, and have been spelled out over a period of time, and what the Defense Management Review did was it actually went through those problems, maybe added a few, but then outlined some specific actions that could be taken to address those problems.

There weren't any real mysteries in the definition of the problems, and there aren't any real silver bullets in the solutions that were described by the DMR. The kinds of problems that we're talking about are the kinds of problems that exist and can exist in any large organization, whether it's commercial or government. They're just problems that build up over a period of time in a large organization. The things we're trying to address are not really glamorous. They're blocking and tackling. They're game plans that are three or four yards at play, no Hail Mary passes. As we put in disciplines in the system, it's just that fundamental and just that unglamorous.

The number one point that came out of both the Packard Commission, Goldwater/Nichols and the Defense Management Review, was to set up a very clear, shortened line of authority and responsibility for the acquisition process. What we have done here is we're in the process of implementing the chain of command that actually goes from my office with the delegated authority from the Secretary and the Deputy Secretary. The next level is the Service Acquisition Executive in each of the services. The next level is a Program Executive Officer, and then a Program Manager. That is the whole line of command for the acquisition process. Getting everybody to understand that and work to it will in itself simplify the process.

Dick Cheney and Don Atwood have made it abundantly clear to everybody in the organization and the Service Secretaries fully support that that will be the line of command.

The second is that we're reestablishing the disciplines and the decision-making process. Programs will not pass milestones unless they have met the requirements. It's just too easy to get up to a milestone and there are a lot of reasons why you ought to just continue to move the program. The discipline that we're trying to move back into is that unless the requirements are met that the program will not move forward.

One of the things we're doing in that regard is that the Defense Acquisition Board is the major decision-making body that we have here for major programs and major milestones. Some of the things we're doing in that regard is we're making sure that the Program Managers are the ones that are briefing the programs, they're in attendance. There was a time when the

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Program Managers didn't even attend the meetings in which the major decisions were being made. They're part of the process at this point.

In addition to that, the decision memorandum that come out of those meetings actually lag the meetings by anywhere from one to four months. We're now getting them out in 48 hours. The people in the system tell me there was a time when the decision memorandum didn't seem to reflect what went on in the meeting, they had been staffed so often and so frequently between the time of the meeting and the time the decision came out. They now reflect what went on in the meeting. That doesn't sound too glamorous, but what that's trying to do is it's trying to put in place the whole cultural approach that the Program Managers are important, they're important to the process, they're important to making the programs work. When they come forward with a decision it has to be treated that way, and they have to get the decisions they need in order to march on. That's the kind of thing that Don was referring to in getting discipline back in the system.

Secretary Atwood: Thanks, John. Let me turn now briefly to the situation of reinvigorating the planning process.

As you no doubt know, we established an Executive Committee chaired by the Secretary, consisting of the two Under Secretaries, the Chairman of the Joint Chiefs, and the three Service Secretaries, plus myself. We meet each week, in which we discuss overall policies and strategies for the entire Department, and in which we take a first cut at what is our national security strategy and our national defense strategy. From those firm positions, the Defense Planning and Resources Board, we plan to meet approximately every other week to convert those broad strategies to formal defense planning guidance and discussion of strategic issues. Because of the world situation, we find we're meeting not once every other week, sometimes as many as twice a week. It means that in fact we're discussing these strategic issues to be sure that the dynamic situation throughout the world is readily impacted on how we look at our budgeting process and how we look at any changes that we might consider for force structure or for porogram changes. It's a system that is working. It's working well, and it has the top leadership of this Department, both military and civilian, all the way through from start to bottom.

The third thing I would touch just briefly on was the business of reducing micro-management. Obviously, we've had a major effort in looking at what legislation is necessary in order to relieve the micro-management that we're accusing ourselves of, and other people accuse us of having, from Congress. A detailed report with recommendations has been completed. It was done under the direction of Jack Marsh, the former Secretary of the Army. He is working with OMB and other members of the White House staff preparatory to sitting down with the staffs and with Members of Congress to work out what is practical, how do we approach that. That process is well in being.

But it isn't just oversight from outside. We do a tremendous amount to ourselves in terms of internal regulations, internal controls, internal

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controls which we impose on industry. That kind of micro-management is just as serious as that which comes from without. Because it so heavily involves acquisition, we've asked John Betti to head up a group looking at that internal micro-management, and I'd ask John to give you a little progress report on where that is.

Secretary Betti: I might just tell you a little bit about a breakfast I had about a week ago that had nine Program Managers in attendance. It ran for about an hour and a half. I kicked it off by saying I'm just here to hear what's on your mind, what can we do to help you do your jobs better, what do we do that helps you, what do we do that harms you? That was the last word I got in edgewise for the whole meeting. It went on for an hour and a half where they were busy telling me fundamentally a couple of messages.

One is, they are very eager to do a good job, they're trying to do a good job, they do a lot of things very very well, but the system gets in their way. Part of that system is just the amount of instructions we give them, the directives that are out there, some of them mandated by law, some of them we do to ourselves. But in that respect they spend as much time trying to work out the details of how they follow the directives, briefings that are caused by the directives, and they spend more time in working the system than they do in managing the program. That's got to be fundamentally wrong.

One of the examples that I came up with in the Defense Acquisition Board, was I asked one of the Program Managers how often he had briefed that particular briefing from the time he thought he was ready to go to the decision board to the time that he actually got there. He said 80 times. That's sounded just outlandish. So we audited him, and he was wrong. It was only 67 times. So you've got to think about all the time and effort that goes into that kind of system.

We actually then audited six other programs, two from each of the services, and the fewest number of briefings, if I remember correctly, was about 24 or 25 times. That's the kind of thing that we have to get out of the system in order to help these people just do a better job. That's what we're about doing.

As an example of what we're doing, there are about 1,200 regulations and directives in the Department. About 500 of those have to do with the acquisition process. We've completed the review of 400 of those, and out of the 400, only 25 percent will stay as is. When we get through, actually 50 percent will drop out, and they'll drop out either because they're outright cancelled or because they're combined and rewritten in some form or another, but only 25 percent of those will stay.

There are over 12,000 contract clauses, component contract clauses through the system. In a detailed review of those, it looks like about two-thirds of them can be cancelled in the process without hurting anything.

There are over 50,000 specifications that we're in the process of reviewing. Out of those 50,000 specifications, we don't know what that outcome is going to be, but we've picked the top 1,500 that we think are the big hitters, and we're going through them in detail. Do they have to exist? If they have to exist, do they exist in the right form? If they exist in the right form, are they really usable? Do they add value to the system? The whole basis of the review is to start out on a zero base and say number one, do these things add value to the system? If they do add value, are they written in such a way that they can actually be used? Do they assume that we have reasonably intelligent, reasonably well trained people who are trying to do a good job? Or do they start out on the basis that you have to pick up the bolt, put it in a slot, turn it to the right, etcetera? Is it too detailed to actually be usable? That's the kind of in-depth review we're doing in the whole process both in what we're asking our people to do in terms of how they're spending their time, and how we're asking them to do it in the manner are we encouraging them to do a good job, or are we just stifling innovation and creativity in the process?

Secretary Atwood: Thanks, John. I might add one other statistics, and that is there is something like 1.8 million lines of acquisition regulations which go into it. For a quick conversion, that's about 600, 300 page books. All I can say is no wonder it takes nearly 20 pages of specification to buy a fruit cake.

We, in addition to this, need to be very careful about the strength and vitality of our industrial base. As I mentioned earlier, too many companies are willing and anxious to get out of that business or not to business with us. It's imperative that we have a strong industrial base that's making an equitable profit sufficient so they're encouraged to invest in new technology and invest in advanced machinery and equipment. Otherwise, our base will not be there when we need it most. We're taking a look at the fundamental ways that we do business with the industry. In particular, taking a look at progress payments. Taking a look at the way we contract for development programs, and eliminating wherever practical, fixed price, and especially fixed price cost share contracts. We're asking them to make an investment because we're after a competitive position.

We're also taking a look at increased funding on our independent research and development with them. It is imperative that we continue to encourage these companies to be a part of the industry base.

A part of that is the ethics problem, and it does no good for me to say that is a perceived problem and that it's only a handful or two handfuls or whatever it is of people who have been doing something false. The perception of the general public is that the whole of industry and the whole of the Defense Department is rife with corruption. Even if it's one person, it's one person too much because it rubs off on all of us. So we're doing two things. We've set up an Ethics Council with continuous training and retraining of our people within the Department on what the law is and what our behavioral pattern must be, and we've asked industry to help police themselves, for them to set up the same kind of Ethics Council and to put out a pamphlet that indeed describes

in detail how they want their employees to do business. And we, indeed, will be monitoring their activities even though we've asked them to voluntarily come forward with their own audits and their own disclosures. These fundamental steps, I think, are going to turn about the way we do business in DoD.

During the recent activities in Panama, one of the local well known newscasters provided a commentary on it, and he said at a time when mediocrity seems to be acceptable, when excellence is not necessarily the norm, that he was pleased to comment about the excellence of the performance of our armed forces in Panama. I say to you that makes me proud, but it also makes me dedicated to say that those of us who are supporting the armed forces, those of us in the Department of Defense, must expect no less than that kind of excellence and that kind of performance, and that's what this is all about.

So with that, let me open it up to any questions you might have.

Q: Mr. Secretary, I believe you said that every dollar, to paraphrase you, every dollar saved would be money you could put back into spending on weapons or whatever. What's to prevent Congress from saying, if you can save this $39 billion over the next five years, let's give it to us to send elsewhere, given the fact that peace is breaking out around the world.

A: Obviously, that's always a possibility. Congress is not overly generous on occasions, and they've got their priorities. A lot of Members of Congress think we need to also maintain an adequate defense posture.

My point would be, and the reason I made the statement, is that ultimately we're going to get some level of defense spending. The President will make his request, there will be a budget resolution passed that will set an overall level of defense spending, and that's what we then have to mark to. To the extent that we are able to cut overhead, to the extent we're able to reduce the cost of doing business, we'll be able to devote those resources to our top priorities which is providing a first class military capability for the country. There may not be a one for one tradeoff there. Certainly there is if you start with the assumption that you're going to have X billions of dollars to spend in any given year. To the extent we can spend it on modernization of our programs and on force structure and on quality of life for the troops, we'll end up with a more capable force than if we have to spend it on unnecessary regulations, maintaining overhead, spending it to do things that ought to be done more efficiently and more cheaply.

Q: Mr. Secretary, can you describe what you do with something like Systems Command, Air Force Systems Command, out at Andrews? How many people you'd take out of that to achieve these savings? Will you essentially disband it? Will you cut back on civilians, military?

A: What will happen in terms of the briefing is the services are prepared later today, and I'd suggest you go through Pete or his staff, to give you more detailed briefings of what will happen service by service. Each of the service Secretaries have been very deeply involved in the process. They've already got some briefings, I believe, scheduled for later on today where they'll go in and talk to you about the Air Force Systems Command. Some of this level of detail will have to wait a couple of weeks until we actually

submit the budget. In some cases, we've got an obligation to protect the President's prerogatives with respect to his budget submission which goes up on the 29th, so we'll be able to give you even more detail then.

But yet the plans clearly go down to that level. We've got specific proposals. We know where these people are coming out of and what changes are being made. We have some ongoing work too. This is just the first sort of bite of the apple, if you will. There are a number of studies still underway, especially with respect to some of the consolidations that we proposed early on that Don has undertaken that will probably lead to additional major changes and modifications down the road.

Q: The 8,000 people that you've talked of coming out, are the bulk of those people coming from one area, or is this a broad sweep of the whole...

A: It's a broad sweep, basically. Remember, it's 8,000 civilian, 8,000 military in '91, a total of 42,000 military and civilian over the course of the next five years from the changes we've identified in this program. There are likely to be other changes. This is going to be a continuous process. There's no magic fix to managing the Pentagon. You make a big mistake if you think you can come in here with one or two major changes, or one package and say bang, that's it, now everything's fixed. It's a continuous process that we'll work on until the day we leave in terms of trying to improve the operation.

Q: What do you say to people then who contend that this is really just sort of tinkering with the system and that you haven't really proposed a massive overhaul here, a radical change of how...

A: I don't think we need a radical change. I would argue that the Department over the years has in fact done what's been requested of it, that we've provided for the safety and security of the United States through some very difficult times. That we've got a first class military capability. That we've maintained the kind of robust, strategic deterrent that has deterred war for over 50 years now. That we've got in our conventional forces the capacity to do what we did in Panama two weeks ago. To say there's something fundamentally wrong with the Department of Defense is just not true. Can we do a better job than we have in the past? Can we spend our money more wisely? Can we find savings in a $300 billion enterprise? Obviously we can. That's what the Defense Management Review is all about.

Again, the notion that a radical fix will take care of it is sort of the notion that there's some silver bullet out there that John talked about, that will overnight automatically solve all your problems. Running a $300 billion enterprise, one of the largest in the world, is hard work. It takes major dedicated effort day in and day out. You have to keep after it and keep after it and keep after it. It's three yards and a cloud of dust, it's not a 60 yard touchdown pass.

Q: Mr. Secretary, you have been here now for about ten months and you've been working on the reorganization for about that long. You were an outsider before that, largely, to the Pentagon. Have you been surprised by what you have found, or is this pretty much what you would have expected?

A: Are you talking specifically about the Defense Management Review?

Q: About what we're doing today. Did you know it was this bad before you came here? Or was this pretty much what you figured needed to be done?
(Laughter)
A: That's a two hour speech, I suppose. What I've learned in ten months as Secretary, sound bite.

I guess my general impression is more positive, having been here for ten months, than it was when I arrived in terms of the quality of the operation. That's by no means to say it's perfect or to be an apologist for everything that's been done here or to say we've never made any mistakes. I'm sure I've made mistakes in ten months. But after you spend ten months working with the men and women, in uniform and out in the Department, looking at what they do and why they do it, and the kinds of restraints they operate under, and the kinds of pressures that impinge upon how we do our business, whether it's the press or White House or Congress or relationships with foreign allies or public demands, it is an enormously complex process and enterprise that works amazingly well.

I don't want to give anybody the impression that it's perfect. It's not. But the idea that somehow this organization -- the Department of Defense and the military services that are a part of it -- is all fouled up, it seems to me is a totally fallacious idea. If you want proof of that, look at what we did in Panama two weeks ago.

Q: In light of the new PM PEOSAE structure, what is the rationale for continuing to maintain the same commands that have those functions?
Atwood: There are a couple of very good reasons. They did not have missions alone to run the major programs. For example, we're going to have them provide the resources which are available and would be transferred to the Program Managers as they execute a program. But those are changeable depending upon the status of the program. They provide the resource to provide them and to take them back and allocate them.

Number two, we can't really afford to have each Program Manager have its own laboratory or its own test facilities. Otherwise we'd have hundreds of test facilities and hundreds of different laboratories throughout, so the Systems Command, the Army Materiel Commands will be providing these laboratories.

Finally, there are many programs that are in a stage which is such, the service support parts, for instance, that you don't put under a Program Manager. So they have a definitive function, but that function does not include an umbrella over the Program Managers. That function is going to be streamlined, the Program Manager will report directly on through a chain into the Acquisition Executive, into the Under Secretary for Acquisition. But the service commands -- the System Commands, the Army Materiel Command -- will have a continuing function of a support role, as I mentioned.

Q: Do you expect these logistics commands to be treated similarly, that is in terms of the fact that they acquire things? Is the same structure going to work there?
A: We are working on changes within the logistics command within the services and John Betti himself, I might let him talk about that, but the same kind of simplification and support services will be provided by the logistics command.

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Q: Mr. Atwood, I think the Packard Commission talked about a goal of a 20 percent cut in acquisition personnel. Is that your goal? If so, what kind of numbers are you talking about, and when can you reach that goal?

A: We did not set a goal, nor did we try to absorb the goal of the Packard Commission. I think rather we're taking a look at it and saying how do we make a fundamental improvement in the way we do business to become much more efficient? And the fallout of personnel and the improvements of dollars are a natural result of having done that. As opposed to saying I'm going to take a 20 percent reduction in head count. I can accomplish that overnight, but I may ruin the organization by so doing. What we've done is take a look at our operation and let the savings and the head count reductions follow therefrom.

Q: If DoD is trying to emphasize quality in contracting, why do the services continue to accept bids that include labor rates as low as $6, $7 an hour for high tech talent for engineers?

A: I can't comment on a specific like that, but let me say we deal with organizations which have different labor rates. Some companies have a strong union and a strong union relationship and they have higher labor rates or they're in a higher labor rate part of the country. So for me to answer any specific question I'd need to know where the location is and what it was about.

But let me say this. Quality is not necessarily a function of what you pay your people. There are people who do an outstanding job at the hourly work rate level, whether they live in one part of the country or another. Quality is a system that's built into the way a company operates. All too often we within industry, have blamed the worker for poor quality, and the simple truth is, it isn't the worker. It's the way we do our business. It's what we set up for our processes. It's how we design the products. It's how we test the products. And it's all too often blamed on the individual worker.

Q: What percentage of the overall acquisition personnel, total acquisition personnel, are the 42,000 in terms of military and civilian?

A: I don't have a number off the top of my head.

Betti: The number that's quoted as being the total acquisition work force is over 500,000.

Q: Over 500,000?

A: That's what the DMR said. But the thing you have to keep in mind that has been said through this that's important, is that the acquisition process is really a means. It's not an end. So what we're trying to do at the acquisition process is to get the weapons systems, to get the products that are needed by the fighting forces, if you will, at the highest quality that we can get them, certainly the quality they need to perform the way they're intended to perform, the way that customer wants them to perform, and then at the lowest cost. So when you start focusing on the manpower that's in the acquisition process, you're kind of focusing downstream. That's certainly one of the things we want to get out. But if we could get programs on time, on cost, performing the way they're intended to perform, the money will peel out of the program. It will make what we're doing in the acquisition head count look almost insignificant. That's why the process is important.

Q: I thought I heard a bone being thrown to industry in the middle of your presentation, and that was that you wanted to increase the R&D budget. I think there was something in there. Can you tell us where this spending is going to go or just exactly what you mean?

Atwood: I think I mentioned specifically the independent research and development. As you undoubtedly know, on every contract there is an allowable IR&D cost factor similar to G&A or similar to any other expense. That comes about because each contractor submits to the three services a research and development program, and they're accepted, and then the tri-services agree that we will pay for 80 percent or at some nominal percentage, and we allow the to charge that against the contracts they do business with us. They must also charge it against any of their commercial work too.

All I'm saying is that over a period of time we see independent research and development continuing to grow. I see no reason, even in today's environment, that that should go back or cut down at all. Now is not the time to cut out research and development.

Q: What is the level of spending now and what percentage growth do you expect?

A: Let me give you a ball park. It's let's say 5 percent, it's probably in the $5 to $6 billion range, but please don't hold me to that. I can get you a better figure.

Q: Can you talk about this new service corps, the acquisition corps of full time experts that will be developed? And perhaps, Mr. Secretary, if you could talk about how that fits in with the notion that the services appear to be trying to get away from this kind of buresucratic culture and recast themselves into warriors. How will this fit?

A: As far as we're concerned, one of the big complaints that has been levied against the Department is that we have an acquisition corps which is made up of people who go in and out. In other words, we put someone into the acquisition corps for maybe a two year period of time. They do not become experts in it, and then they're soon gone. So on a longstanding program that goes on for four or five or six years, you have this change and the discontinuity that develops.

What we're hoping to do is to set up an acquisition corps of trained, experienced people who become relatively permanent in those assignments. They become experts. That's the way we'll improve that acquisition.

Now when we deal with people in the service, we would like for experience purpose to have nearly everyone go through acquisition. We hope a significant number of them become experts and like it. Not everyone can become Chairman of the Joint Chiefs. Not everyone can become CNO. There will be people who want to stay in acquisition, just as there will be probably more who want to get back out into the ranks of the operations.

Q: Mr. Atwood, in changing all the regulations that you were talking about that govern acquisition and procurement, how are you guaranteeing that in your effort to do that, and in your zeal to keep businesses happy and to keep them doing business with you that you're not going to go overboard and take away too much of the oversight that was obviously put there for some purpose in the beginning?

A: I'll let John answer that after I give a first, because he'll correct me. The fundamental truth is, we put on many restrictions that have nothing to do with the ultimate performance that we're seeking. As a result of that, we burden the industry down with a classification security, with particular paperwork they must file. I heard a case recently, someone wrote me and said they had had a design review and they had a design review in which they had

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30 people working on the program, and we sent 40 in to audit the design review. Then they put out a massive series of documents. You know what the net result was? Their security is lax. They're just not set up to handle that sort of a thing.

We impose many kinds of restrictions on this on our own way. We're not relinquishing the right to audit them, the right for the IG to look at what they're doing, the right for the Comptroller to go in and audit their functions. We're not relinquishing that at all. What we're talking about is the cut back in burdensome regulations. I want John to amplify that.

Betti: Don gave you one of the more efficient design reviews, because I've heard of where we've sent over 100 people to these design reviews. If you think of a design review as wanting to go through the details of the design and you've got over 100 people sitting around, they can't even look at the design. You now have to simplify it and put it in overhead projectors or slides or something. That's part of the process.

But I think more specifically to your question, and I'll underscore what Secretary Atwood said, is that if you assume that all the directives and regulations we have out there have added value, then we have no business tinkering with them. The problem is that they don't. They not only don't have added value, but in some cases they even tend to contradict each other and make the job of managing the programs that much more difficult.

Those regulations or those directives that add value, that provide the kind of oversight that are necessary in a program will not be tinkered with as long as they're usable and understandable. As a matter of fact, they may actually be amplified in some form.

So we're trying to get rid of the non-value-added. We're not trying to get rid of the oversight. We're trying to free up the Program Managers, is another point. We're trying to free up the Program Managers to do the job we've given him, and that's manage the program, it's not manage the paperwork. That's the kind of thing we're trying to do.

Q: Are you going to release copies of some of these regulations that you have eliminated and combined?

A: We haven't intended to, but there's no reason why we can't make it available.

Q: Mr. Betti, in terms of your authority over the Service Acquisition Executives, I gather the authority is that you can direct their manner. How does that work out? Do they report to you or do they report to the service Chiefs?

A: They report to the Service Secretaries, but I have the authority to direct the Service Secretaries in any acquisition matter. It has nothing to do with force or warfighting, but in acquisition matters. I have the right to go into the system to review any acquisition program, any acquisition strategy, any acquisition decision I care to. The major programs, the ones that are identified as major programs, have to go through the Defense Acquisition Board, and when they go through the Defense Acquisition Board they get a thorough review. And as I mentioned earlier, that's where the decision is made as to whether they can proceed from one phase to another phase.

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Q: Have you obtained that right to go into any acquisition, you personally, since you came in on the job?

A: You mean am I new at it?

Q: No, your predecessors complained they didn't have that authority.

A: It's never been questioned. The two Secretaries told me I had that authority when I came here. It's in writing. And I've just never questioned it. Nor has anyone else, to the best of my knowledge.

Q: Mr. Betti, is it fair to assume, and I may get the same nebulous answer as this fellow who asked about Andrews, but we need to ask this. Is it fair to assume that some of this work force reduction will take place at the Logistics and Systems Command Center in Dayton, Ohio? And if so, how are these reductions to take place, by overall layoffs?

A: I think you're right. You're going to get the same nebulous answer he got.

(Laughter)

Atwood: Could I add something to that?

Q: Please!

A: You asked a very specific question, and we're not prepared to give you that because we need to work all of the details out with the proper people and with those who are represented on those areas. But specifically, there will be head count coming out of Logistics Command. There will be head count coming out of Army Materiel Command. There will be head count coming out of the Air Force Systems Command. There will be head count coming out of DoD here in the Pentagon.

Q: How will they pick...

A: If you look at the numbers, and then you just heard a number of the total here. Our normal attrition rate is on the order of magnitude of 50 percent higher than the head count reduction which we're taking, so that our first goal is to absorb these head count reductions through attrition. Now this may not be possible in every case because some specialist, if we had one chemist, for instance, and we lost that chemist, then we're obviously going to have to replace that chemist. There may not be cases where we can do it all by attrition, but that's our goal and that's what the Assistant Secretary of Defense for Manpower Planning is doing. He's looking at it in just that way.

Q: If you rely on attrition, won't you be losing more lower-graded employees since their rates of attrition are higher? Your goal is to reduce management, I assume.

A: Number one, we're going to reduce across with a diagonal slice. We're not looking to take out just the lower level people. But again, I said the normal attrition is considerably higher than that which we want to reduce our head count by, and the first goal will be to do it by attrition.

Q: But attrition rates are higher among lower graded people, so the people that are leaving are not necessarily the managers that you're supposed to be stream lining. Are you considering things like early outs?

A: That's a possibility, but we haven't made any plans on that. I don't want to imply that I agree that the attrition rate of lower level people is higher. I just don't happen to know the answer to that.

Q: The $39 billion over five years and the 42,000 jobs, is that already a best case scenario? Or six months from now can you come back to us with another progress report and say we've now got it up to $50 billion and 100,000 jobs or whatever?

Cheney: The 42,000 slots we're talking about, end strength reduction, the $39 billion reduction in the budget, are very specific reductions, cuts, savings, that we've already identified as a result of the progress we've made so far on defense management. We may well be back before you in six months and say these are additional changes we're going to make and these are the additional savings that go with it. But this is not fuzzy in the sense that this is an estimate of how much we save. The same way we ordinarily put together any budget, we've identified the reductions and the changes in procedure and the amount of money we spend on various functions, and we're no longer going to spend that amount of money. We're going to spend $39 billion less.

Q: How can you have specifically identified $39 billion worth of savings, and not be able to tell us specifically where those savings are going to come from?

A: First of all, again I come back to what I said earlier. The services will have additional detailed information about specific reductions. In terms of the bases that are going to be affected and the specific organizations and the amount that comes out, we've made those decisions but we have to continue to work that through the process internally. We also have to let the President announce his budget on the 29th of January or thereabouts. I'll be back before you down here to brief in detail on our budget. We also have some obligations to the Congress in terms of working with them as well.

So over the course of the next few weeks you will be getting additional detail that will allow you to answer the question what's going to happen in Podunk, Ohio, as a result of these changes.

Q: Mr. Secretary, your report notes that the optimum mix of support staff to field personnel is 1 to 61, and that's where the Navy is at. You suggest the other services can achieve similar savings by scaling back to that ratio. I'm wondering if you have the one to what number for the Air Force and the Army?

Atwood: No, but this was a recommendation and acceptance by the Service Secretaries on that item. But we don't have a bogy out there that they have to reach. This was in our discussions of the Defense Management Review and Report. These were actions which were taken in concert with all of the Service Secretaries.

Q: But you're telling them to reach the Navy's goal of 1 to 61. They're not there now. I'm wondering where they are now.

A: I don't happen to know the answer to that.

Q: At what stage is this in actually being implemented? Are you laying off people now? Are you not going to begin laying off people, redoing this until after the budget comes down? Where are you in this process?

A: I want to repeat what I said earlier. We are not planning to lay people off. Our attrition rate exceeds that normal decline in head count that we have. What we have is the Assistant Secretary for Manpower Planning going through all of the records, taking a look at what we see in attrition and making plans with the services as to how we can accommodate that.

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Q: But you're not attriting now?
A: Oh yes, every day. When I say that, every day we have people who leave.

Q: So you're locking those programs down now?
A: That's correct.

Q: When an opening comes, you're locking it down and not filling it.
A: We're in the process of doing that right now.

Q: The White Paper on legislative relief that you sent up to the Congress, do you have any estimate of how much you could save if all of those changes were put into effect?

Cheney: No. We've tried to be very conservative in our cost estimates on how much we can save. We don't want to come down here, because I said when I first talked to you about the Defense Management Review last year, we don't want to come down and make high flying promises about how much money we can save by doing a better job of managing the Pentagon. We've tried to be very precise, very conservative, very deliberate in the way we proceed. We will probably not get Administration approval for all of the legislative changes we'd like to make.

What Jack's done at our request is pull together, work with Don and myself and John Betti and others, has pulled together a good package. We're in the process now of finalizing specific decisions that relate to that. The package is completed. We've had some preliminary discussions, I mentioned it with the President when we briefed him last week, and with Dick Darman. That then has to go through the inter-agency process. That is, you've got to get OMB sign-off before it becomes official Administration policy. Then we'll take that to the Congress and try to get it approved.

We have not put a dollar figure on the savings that can be achieved as a result of that yet.

Q: Mr. Cheney, this has been such a confusing and changing year. I've heard that the PPBS process within OSD has simply broken down, or simply hasn't been able to operate. Will you in fact be preparing a detailed FDYP this year for Congress?

A: We will have a FDYP for Congress as is now required by statute. That is a long term look at where we're going over the next five years, that we will be prepared to talk about, the Chairman and myself, when we go before Congress starting, I believe, February 1st now is the first date when we actually go up and start the testimony on the next authorization.

I don't think the process has broken down. What we've had to do is accelerate it. The fact of the matter is, a year ago, ten months ago when I became Secretary, you still had communist regimes all across Eastern Europe. The Warsaw Pact was a formidable military force, etcetera. Today, you've got the governments having changed in most of those countries; further erosion, if you will, in the Soviet Union; the beginning evidence now that we're seeing some decline in Soviet defense spending; a non-communist headed government in Poland; prospects for free elections in other places in Eastern Europe. So to try to put together a five year plan now based on the assumptions that were valid last summer doesn't make any sense at all.

What we've had to do is accelerate the process. Ordinarily we would have submitted in '90 and '91 a two year package, and we would not come back with major program changes until the '92 cycle. We've tried to accelerate that so we can have in our five year forecast that we'll go up with the first of February our assessment of what we can do if we make certain assumptions over the next five years in terms of our total force posture, force structure, etcetera. We will submit that to the Congress.

An even more detailed package will be what the services are ultimately able to produce through the normal '92 POM process which is currently underway, but also has had to be adjusted. That process, I believe they come back to us I think in April with their submissions, and that's for the budget that goes to the President next December and to the Congress a year from now. It's a continuous process. On any given day we're working on about three different budgets.

Q: ...between the five year forecast and next year, back to a five year defense plan?

A: We're going to do our very best with our testimony in early February, the Chairman and myself, to give the Congress an idea of where we think we can go over the next five years, given recent developments, and making certain assumptions about the future. Follow on to that will be as detailed as possible, a five year program that actually prices out the various systems and gives the Congress a pretty good idea of FDYP of where we're headed. We'll do our very best, given the rapid changing developments that we have to deal with.

Q: Is there any way that the DMR looked at improving the efficiency of the system bases in the U.S. or overseas? Did you look at base closures at all in order to save money? And are there any recommendations in there to recommend the closure of bases at all?

A: There will, I believe, although we are still wrestling with exactly how to do this, there will be additional base closures. The exact process by which we undertake those, and the extent to which they're driven by the Defense Management Review, and the extent to which they're driven by other considerations, I'm not prepared to say yet. But when we come back to talk to you about the budget in a couple of weeks, we'll have more on that subject.

Q: Can you give us an extent of the base closures you're looking at?

A: Extensive.

I'd be happy to take a couple of questions on non-DMR.

Q: Do you have any detailed pull-out plan yet on Panama? Any time tables set?

A: We're very close to having some additional details that we can give you on the Panama withdrawal. The 82nd Airborne will be coming back to Bragg tomorrow. General Steiner who has been the Commander of Joint Task Force South, who's been basically our combat commander in Panama, will be returning with that unit. So we will be standing down Joint Task Force South as of tomorrow.

Within the next day or two, I would hope we can give you a release that lays out some additional milestones and time lines for further reductions of our deployments in Panama. We are going to be moving fairly rapidly to bring the troops home over the course of the next several weeks -- reminding everyone that we will retain a residual force in Panama just as we had a force there before all of this started. That force will stay in Panama.

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Q: Do you foresee that force being along the lines of the 10,000 to 13,000 that were there? Or somewhat larger than that?

A: I think we'll go back to the level that was there previously. Now exactly what timeframe, that's what we're wrestling with today. But we'll get that for you as quickly as possible.

Q: Mr. Secretary, going back to the period of several months before the Bush Administration came to office and you were named Secretary, we can recall discussions from the podium there whereby the cost ineffectiveness and inefficiency of using major ship task forces to interdict drugs was driven home to us time and again from that very place. And also were the use of military personnel in making apprehensions of suspected drug figures, abroad or at home, we were warned against that in the name of the Defense Department. Has so much changed in the past two years that these considerations have gone out the window?

A: I'm responsible for the policies of the Department of Defense since March 17th of last year. I can't vouch for, defend, or criticize what my predecessors may have done.

What we've tried to do with respect to the Department in the drug role is to respond to the directives of the Congress which in the '89 statute made us the leading agency, if you will, in the interdiction role internationally; respond to the directives of the President for the Department to get more actively and aggressively involved in the drug effort. We've done that.

There are, I think, a number of things we can do to enhance and increase our effectiveness. I think there are also limits on what the Department can do, and I've spoken to both of those repeatedly. The limits basically are that we're not a law enforcement agency. Especially where the United States is concerned here domestically, we do not want U.S. military personnel involved in performing law enforcement functions. We can do a lot to support law enforcement agencies. We can do a lot with respect to intelligence collection. We can do a lot with respect to training and the kind of support that we're now providing through the $40 million funding for the National Guard all over the country, and the kind of effort that's underway with respect to NORAD and the aerostats along the Gulf of Mexico coast. There are a great many things that I think we can in fact do and we are in the process of doing.

Now as to the effectiveness of it all, I guess I've heard repeatedly over the years why things can't be done. You can't deal with the drug problem. Everybody wrings their hands and says it's a tough problem, we can't interdict the flow of traffic or we can't deal with the demand problem here at home. The message I've received from the Congress and the President and the American people is, damn it, we want to do something about the drug problem. We want the agencies and departments of the federal government, to the extent that they've got something to contribute to the effort, to so contribute. That's what we're doing — keeping in mind that our basic mission is the security of the nation; keeping in mind that we don't want to do anything in the drug area that detracts from other kinds of activities. But I think there is a great deal we can do. I think we've started on that process. The question of how effective it will be, it seems to me, is something to be judged after we've had some experience with it. And I'll be the first to admit we don't know precisely how effective each piece of it's going to be, but I do know we're not going to have any impact at all if we do nothing. We're not prepared to do nothing.

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Q: Are you disappointed that the KENNEDY group was not able to go down and conduct the exercise off of Colombia?

A: No, I think we would have preferred to have that process go forward originally as planned, but in light of the leak that led to the premature disclosure of the operation before we had the opportunity to consult, the need for consultations, all of that's on hold now. At some point perhaps we'll be able to come back to it, but only after we've had further consultations with the other nations that are affected by it.

Q: When you publish your plan, can we expect more of this sort of thing? More of operations of Navy ships in that area?

A: Again, it's a continuous process. We've been doing a lot of these things in the past. Sometimes it's a question of degree. When we're able to announce more, then I'll be out here to talk to you about it and answer specific questions about it. I wouldn't want to speculate about it beyond that.

Q: Is it necessary to have a beefed up task force in the area when the President goes to Colombia for his anti-drug summit?

A: I wouldn't want to get into those kinds of arrangements.

Q: When the United States forces in Panama, for example, ringed the Peruvian Embassy, or go into the Nicaraguan Ambassador's house, what sort of guidelines or conversations have you had with the Endara government about how the United States can operate inside another sovereign nation? Under what authority?

A: Well we're in Panama under the authority that's been cited by the President previously. We're in Panama under the Panama Canal Treaties. We have a right to have forces deployed in Panama. We also, obviously, undertook the operation on December 20th, Just Cause, for several other reasons. The recognized right to defend American lives, to protect American interests under the Canal Treaties, and also obviously, to try to bring Mr. Noriega to justice, which we've now successfully done, and finally, to restore democracy to Panama -- all important considerations. We acted upon that basis.

Our operations inside Panama at present are being scaled back. We did, in fact, I think inadvertently go into the Nicaraguan Ambassador's residence. It was inadvertent. We apologized for it. I think our troops did a good job. I don't have any problems with the way they conducted themselves, and I don't feel any need to criticize or at all be critical of it. We're operating down there now for the same reasons we went in, but increasingly we're in a position to be able to reduce, if you will, the U.S. level of military activity, to bring out units, to transfer more and more authority back to the Panamanian government, the Panamanian public force in terms of security and so forth.

Q: ...estimates of the civilian casualties in Panama have met with some skepticism. First of all, are you completely confident that the U.S. estimate is not going to rise? Have you been briefed on it?

A: No, I don't have any way of knowing whether it's going to change or not. It's the best that our people in Panama were able to do under the circumstances. You have a reporting system for U.S. casualties, and we know how many people we sent in, we know who was assigned to which units. We can be very precise with respect to what happened to U.S. personnel in that kind of an operation.

There is no such system when you're talking about the casualties on the other side, in this case the PDF or civilian casualties. So to the best of our ability we've come up with an estimate. Everybody said, how many? Well, we've given you the best estimate we could. Is it absolutely locked in concrete, guaranteed gold plated, 100 percent accurate? Probably not. It's the best we could do under the circumstances.

Q: Do you feel it would be appropriate under the circumstances to offer some compensation to the families of those that were killed?
A: I haven't given it any consideration.

Q: Do you think the military commanders on the ground have failed to bring in U.S. diplomats or embassy personnel in making decisions on operations?
A: No, I think it was the kind of situation in which once you move to the point where you're deploying U.S. military forces, and you have a military operation underway, you have a different chain of command, different considerations than you do ordinarily in peacetime operations. Then the chain of command shifts over and goes from the President to myself, down to the CINC, through the Chairman, out to the commander on the scene. Once you move back into a peacetime environment, the ambassador in the country becomes the leading figure, if you will, and you make a transition back to a more normal kind of day to day activity in terms of who has authority to do what. We're now in the process of making that transition.

Q: You indicated that there may be extensive base closings. Would that be in the context of the budget? And can you give us a sense of how extensive? Will they also include oversees bases at all?
A: It will be within the context of the budget, and more than two.
(Laughter)

Q: Will you recommend a new commission?
A: We'll talk about that when it's budget time.

Q: Any oversees bases?
A: We certainly are looking at oversees bases as well as domestic bases.

Q: Mr. Secretary, on the use of the stealth fighter in Panama, how high up did that decision go to risk such an expensive airplane in the operation?
A: It came to me. I reviewed it.

Q: If it had not been used, if they'd used A7's or A37's or whatever, would it have made any difference in your judgment?
A: When the planning was done, and I was briefed on the plan in advance, there was more extensive use proposed for the F117. I questioned specifically why did we want to use that particular system and why on those particular targets. They went back to the drawing boards and came back with a scaled back plan in terms of the number of targets effected. The rationale for using the 117 was the fact that when we wanted to operate at night, which was crucial I think to the success of the operation. That's something we do very well, our night time operations. I think that had enormous benefit in terms of reducing the overall casualty level, and the 117 is designed specifically to operate at night. That's the only time it does operate. It loses its stealth characteristics in daytime, obviously.

But secondly was its great accuracy, and we wanted pinpoint accuracy because what we were trying to do with that particular mission was to save lives. We were trying to stun and disorient the Panamanian forces at Rio Hato so that our own Rangers could go in in an air drop and capture the facility with minimal loss of life to our own people and to the Panamanian people.

So the fact is that we used the 117, and it worked. They dropped with pinpoint accuracy. My own personal belief is, based on talking with people who were involved in the operation, that it did indeed have the desired effect.

Q: Did you say it loses its stealth characteristics with daylight?

A: It can be seen. Visible. (Laughter) It's not because the sun's shining. It can be seen. The F117, after it went operational, has been operational some years in the desert, it's been deployed in Nevada under very secret and secure circumstances. It flew only at night. It flew only at night, obviously, because we don't want people to see it.

Q: Is the operation in Panama going to be used in budget justifications for justifying A12 and so forth?

A: Of course not.

Thank you all very much.

Mr. Williams: Let me just add a quick note. The Services are prepared to give you somewhat more details. Obviously, they can't go into budget detail either. Their Secretaries are prepared to talk to you on various schedules. Thank you all.

END

NEWS RELEASE
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**HOLD FOR RELEASE at 12:00 noon, Eastern time, April 5, 1990**

## Administration proposes new laws, seeks cooperation with Congress to improve Pentagon management

Secretary of Defense Dick Cheney today asked Congress to change the laws governing the way the Pentagon manages its personnel, disposes of property, and makes its major weapons purchases. He urged Congress to pass the legislation this year and to adopt changes in its own procedures for dealing with the Pentagon, saying both actions are needed to help in the Department's continuing efforts to run more efficiently.

Cheney and Deputy Secretary Don Atwood said the Administration sent the package of legislative reforms to Capitol Hill today, fulfilling a recommendation from last July's Defense Management Report. Prepared at the direction of the President, the report said Congress "must devote serious attention" to defense management questions if the ambitious goals of Pentagon reform efforts are to be fulfilled.

The Secretary today also sent to members of Congress an analysis of changes they should make in their own procedures for passing defense legislation and providing oversight of the Defense Department. The White Paper on the Department of Defense and the Congress was also required by last summer's Defense Management Report.

"We can do much to improve defense management by ourselves. We could accomplish far more with the cooperation of Capitol Hill," Cheney said. "If lasting changes are to be made, they must be the result of a partnership between the Department and Congress, each dedicated to removing every redundant layer of regulation or oversight. It's cooperation -- not confrontation -- between DoD and Congress that will make the system work."

"Every recent study of defense management and organization has concluded that reform of the Congressional oversight process is a necessary element in an effort to improve defense management. The duplication, complexity and lack of coordination in the Congressional process is, in itself, a hindrance to better management of the Defense Department," according to the White Paper.

(more)

The White Paper says the current Congressional defense process is characterized by a multiplicity of actors, overlapping and sometimes contradictory decisions, lack of finality, disintegration, and lack of accountability. "The focus is on details at the expense of broad policy, functions at the expense of missions, and the accounting inputs at the expense of results," it says.

The White Paper recommends that Congress shift to a two-year budget cycle for the Defense Department, which would allow better planning and stability in program funding, and end the practice of reviewing all procurement programs every year. Instead, Congress should review programs as they go through major phases, such as from development to production. And it says Congress should reduce the level of detail required for budget material and focus on broad missions rather than individual items of hardware.

Among the other areas which could be improved, the report notes that:

- Congress frequently imposes detailed requirements on individual weapons systems or activities, often without adding any valid military requirements. "Although the Department is not required to comply with these forms of guidance as a legal matter, the consequences of ignoring such advice frequently compel compliance -- this year's ignored 'suggestion' may become next year's statutory requirement."

- The most common justification for Congressional intervention is poor program management. But the monitoring mechanisms which allow committees to review decisions or second-guess Department actions are used regardless of program performance. Their proliferation leads to extensive micromanagement.

- The desire of each member of Congress to advance constituency or policy goals pushes committees into competition with one another, driving the defense committees in particular into deeper and deeper levels of detail to assure a preferred outcome. Intervention in individual programs through report language or statute can be an even more refined method of serving parochial interests.

- The Congressional system works against ever making final decisions about spending on weapons systems. "If next year's budget debate is only a few days away from the end of this year's debate, there is no reason to accept a negative decision as final."

- The Defense Department is urged to act more like a business, but it is saddled with requirements that prevent businesslike operations and discourage private businesses from dealing with the Pentagon.

- And Congress encourages the military departments to deal with Capitol Hill independently, creating factions within the Pentagon. "This effort to divide is an enduring aspect of Congressional defense policy."

(more)

The proposed Defense Management Improvement Act sent to Congress today is intended to enhance the ability of the Department to encourage competition from both large and small businesses and improve the efficiency of the Department in managing its major programs. It would allow DoD to:

- Make greater use of multi-year contracts, allowing better long-term planning for both the Pentagon and the companies with which it contracts. The resulting program stability will lower costs, encourage contractor investment, and promote greater competition, reliability, and attention by company management to the program.

- Conduct a pilot program of private sector management practices in up to six major defense acquisition programs, testing the extent to which these techniques will result in increased efficiency and economy in the management of major defense programs.

- Award contracts on the basis of greatest benefit to the government and a supplier's proven performance, rather than simply the lowest bid.

- Use commercial-style purchasing procedures when buying off-the-shelf products. Many sellers of commercial products do not compete for government business because of the specialized and complicated government purchasing requirements and practices. Such a change would make it easier for suppliers, especially small businesses, to compete for defense contracts.

- Use dual-source contracts only when warranted by an analysis of costs and benefits, giving the Department greater flexibility in weapons procurement.

- Improve the management of civilian personnel. When combined with a forthcoming legislative proposal on pay reform from the Office of Personnel Management, the resulting changes would give the Department more flexibility in providing employment incentives, including pay and promotions. Such changes are especially important in attracting and retaining a well trained acquisition work force.

- Give the Department greater ability to intelligently manage military personnel, especially as the force is reduced. In concert with our proposals to amend the Defense Officer Personnel Management Act, such changes would enable the services to provide greater incentives to attract and retain those with critical military skills, to improve career development and advancement for officers in the acquisition field, and to more effectively manage future reductions in the officer corps.

- And provide strong incentives for DoD financial managers and base commanders to sell or lease land and buildings.

"The Department of Defense is hard at work on improving the way it does business. The legislation we've sent to Congress will allow us to do our jobs better, and the White Paper recommends ways Congress can improve its own defense budget and oversight process. Together, these initiatives will make the changes that must be made if the nation's taxpayers are to get the most for their defense dollars," Atwood said.

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**NEWS**
BRIEFING

Office of the Assistant Secretary of Defense
(Public Affairs)

DoD News Briefing
Secretary of Defense Dick Cheney
Deputy Secretary of Defense Donald Atwood
Thursday, April 5, 1990 - noon

Mr. Pete Williams, ASD/Public Affairs: Let me explain to you that in addition to the news release that we have, we also have the White Paper which the Secretary will be discussing today. And then, something called the section by section analysis, and if you're not familiar with what this, this is a sort of a tool that they use on Capitol Hill. It goes through the legislation that's been sent to the Hill which the Secretary and the Deputy will explain in a moment, and explains in something very similar to plain English, what each section of the bill will do, because the bill itself is all very formally written. So this goes through each section of the bill and explains what its provisions are.

Both Secretary Cheney and Deputy Secretary Atwood will have a little statement to give you and then they'll be happy to take your questions.

Secretary Cheney: Is this a new podium Pete?

Mr. Williams: No, it's the same old one; we just took part of it off.

Secretary Cheney: I have asked Don Atwood, the Deputy, to join me this morning. We have a couple of subjects we want to talk about today. Pete's mentioned the legislation and the White Paper Report on the Department of Defense and the Congress. All of this, I think, is best viewed as part of our continuing effort with respect to the Defense Management Report. As we've said before, the process of reforming the Pentagon is something that's not done overnight. It's something that you have to work on steadily and constantly. What we've got today are the products of several months of effort by many people within the Department, at the direction of the President, to improve the overall management of the Pentagon.

The report that we put out last summer, done at the request of the President, said if the ambitious goals of the Pentagon reform are to be fulfilled, then Congress has to also devote serious attention to the subject. Today we're here to talk specifically about how Congress can do its part. I want to emphasize and will again at the end, this is not an effort to indict Congress or to create consternation on Capitol Hill or to say that all of the problems we have here in the Department are the result of Congressional action or inaction. There's a great deal that we need to do inside the building and we're working on as well. But today, the documents we've go specifically focus on the congressional role.

The documents that we are sending up spell out changes that we would like to see both in the laws that govern how we do our jobs here in the Department as well as the way Congress deals with the defense budget process and provides oversight for the Pentagon.

The first document itself is the Defense Management Improvement Act which I'm asking the Speaker of the House and the President of the Senate to introduce for consideration. It proposes changes in the law governing the way the Pentagon manages personnel, disposes of property and makes major weapons purchases. The second document is a White Paper on the Defense Department and Congress. It provides members of Congress with an analysis of changes they might want to make in their own procedures for passing defense legislation and providing oversight of the Defense Department.

There's much that we can do and are doing to improve defense management by ourselves within the Department, but we could accomplish even more with the cooperation of Capitol Hill. If lasting changes are to be made they must be the result of a partnership between the Department and Congress, each dedicated to removing every redundant layer of regulation or oversight. It's cooperation, not confrontation, between DoD and Congress that will make the system work.

I know there are many thoughtful members of Congress who have studied the issue of Pentagon reform over the years and I'm certain they will want to help in this effort. I would like urge Congress to pass the package of legislation reforms this year so that we can get on with the process of improving the way that we do business. And I hope those same members will take a close look at their own procedures because those changes will also make substantial contributions to improving defense management.

Before Don takes you through some of the specifics on the legislation we're proposing, I want to take just a moment to comment on the White Paper. Every recent study of defense management and organization has concluded that reform of the congressional oversight process is an essential part of any effort to improve defense management. As the White Paper says, the reason is that the duplication, complexity and lack of coordination in the congressional process is itself a hindrance to better management of the Defense Department. The problem with current congressional defense procedures is the focus on details at the expense of broad policy, functions at the expense of missions, and the accounting of inputs at the expense of results. What we've recommended, and many in Congress have supported over the years is that Congress shift to a two year budget cycle for the Defense Department which would allow better planning and stability in program funding and end the practice of reviewing all procurement programs every year. Instead, Congress should review programs as they go through major phases such as from development to production. We're also recommending that Congress reduce the level of detail required for budget material and focus on broad missions rather than on individual items of hardware.

Briefly, here are some of the other problems that the Report cites. Congress frequently imposes detailed requirements on individual weapons systems or activities, often without adding any valid military requirement. Although the Department is not required to comply with these forms of guidance as a legal matter, if we ignore the advice then one year's suggestion may become next year's statutory requirement. The most common justification for congressional intervention is poor program management. But Congress often imposes mechanisms to monitor programs which allow committees to review decisions or second guess Department actions regardless of program performance. Their proliferation leads to micromanagement of the process.

The desire of each member of Congress to advance local interests, which is part of their responsibility, pushes committees into competition with one another driving the defense committees in particular into deeper and deeper levels of detail to assure the preferred outcome. Intervention into individual programs through report language or statute can be an even more refined method of serving specific local interests.

The Congressional system works against ever making final decisions about weapons systems. If next year's budget debate is only a few days away from the end of this year's debate there is no reason to accept a negative decision as a final result.

The Defense Department is urged to act more like a business but is it saddled with requirements that prevent business-like operations and discourage private businesses from dealing with the Pentagon.

Again, let me emphasize at the outset as you read the White Paper you'll see in there a number of quotes from members of Congress, the Chairman of the Senate Armed Services Committee Sam Nunn and others talking about these same exact problems. The effort today is to begin a process of working with Congress to try to improve the relationship and to improve the overall process. This is not an indictment of the Congress by any means.

What I'd like to do at this point is call upon the Deputy Secretary, Don Atwood, to say a few words about the legislative package, and then we'll both be happy to take your questions.

Deputy Secretary Atwood: Thank you, Dick.

As we reported to you last January, we've made significant progress in making changes to what we can do within the Department. Since that time we've had a number of detailed studies that have been ongoing coming to fruition now which we think will make improvements even beyond those. But this, of course, is an area that we're talking about today in which we seek some assistance from Congress. In particular, we're looking at two areas, I think, that with their legislative help we can make significant improvements beyond that which we're doing now. The two areas are first of all, to enhance the acquisition process, improve the operation of our whole acquisition system; and the second is relative to both the military and civilian personnel.

Perhaps the most important item that we're seeking legislative help on is to enable us to run a pilot program on up to six major programs, major weapon systems, in which we actually operate those as though they were a commercial operation. If you think in terms of many industries and recognize the type of trust and confidence that goes on between the buyer and the seller, and then think about the Department of Defense and how we do it in which we almost have to assume that there's a dishonest atmosphere out there, and we put in full time auditors, full time checkers, full time inspectors, and then auditors on our inspectors, so that if you were to look at a commercial product going down one line and the identical product going down the other line for military products, indeed you'd see a horde of DoD people hovering over the military line, and there is hardly anyone from the commercial world or customers who cover over the commercial line.

We're seeking permission to alter our approach to this auditing and checking and inspection. We think we can make significant improvements in reducing costs, improving the efficiency of operation, because after all these contractors when we have our people there, they have to have people who counter them. We believe that by reducing the degree of inspections and audits that we put on these contractors, that we can save money. We feel we'll get better products out of it. There will be more emphasis put on self-administering by the contractors themselves. We think we can do that without giving up at all our right to go in and audit. We're not giving up anything. We're just saying we're not going to have full time people whose only job is to check what they're doing. We do maintain the right to go in and do our own auditing and our own inspecting at any time we so choose.

The second area that we're looking at and seeking help on is the ability to award contracts for weapon systems based on total benefit to the government. You recognize that we do take a look when we have a competition at what a contractor's policies, what their practices have been in terms of quality, what kind of deliveries they've given us, what kind of responsiveness they have. But basically, unless from a practical standpoint we can declare a contractor non-responsive, most of our contracts are awarded on price alone. That is simply not the way it's done in the commercial world. They look at a contractor's performance, responsiveness, the quality of his products and weigh all of those factors very heavily, as well as price. We're seeking legislative permission for us to go ahead on that basis and operate our competitions more like commercial businesses.

We're also going to look at some multi-year contracts to lower the threshold. We're entitled to multi-year contracts now, but the threshold in which we're able to allow multi-year procurements are pretty high and we're asking Congress to lower that threshold so we can offer more multi-year programs. Finally, in terms of commercial products, to enable us to more fully just make our procurements based on commercial specs, I won't regale you with the kind of examples we have of many many items in which we have multi-pages of documents, even though they're commercially available off the shelf items. We're seeking legislative help to assist us to do that more effectively.

In terms of personnel, as you know, as we've discussed in the past, there will be a significant draw-down in both the civilian and depending upon the results of our negotiations, the military. The problem that arises is that we have an obligation to these people. In terms of the military, they've signed up. These are not conscripts. These are people that decided to make the military their career. We need to have the flexibility to let them leave with honor, with dignity, and with some kind of a financial benefit so that they look back on this as a profitable experience,3will not be low morale and affect the morale of the other people. We're seeking help in accomplishing that as well as seeking help in accomplishing the ushering out of civilian employees whenever that becomes necessary. As far as the civilians are concerned, we'd like very much to make our reductions largely based on attrition, normal attrition. On the other hand, from a skill factor, you can't always do that, so we're seeking help in both the civilian and the military people.

That's about all I have to say.

Secretary Cheney: Thank you very much, Don. At this point we'd be happy to take your questions. If I might make a suggestion, if we focus initially on the subjects at hand in terms of the legislation and the White Paper, and then if you have other questions once we've sort of dealt with that subject we'll be happy to come back and take other subjects as well.

Q: Mr. Atwood, can you tell us what those six major weapons would be that you want to do the pilot program with?

A: We have not zeroed in on the specific six, but I tell you they'll be early enough in the procurement cycle so that we're not going to be dealing with something that's in the final phases of production. We're hoping to look at something that's either still in concept phase or at best in the full scale development phase, but we're looking at perhaps two in each service.

Q: Mr. Cheney, before all the changes in the world, shifting to a two year budget cycle was sort of a standard refrain. With all the political changes going on in Eastern Europe, it's become very difficult to plan two years at a time. In fact the Defense Department has presented what it calls a transitional budget. You don't even really have a one year plan since you got this major aircraft review and you reserved the right to update your one year budget.

Does it still make sense to plan for two years at a time and ask the Congress to agree to this when you don't know what's going to happen in the world?

A: I think the general principle is a very sound one. Obviously things have changed rapidly in the world, but at some point stability will return and we will be able, I think, both as a department and as a Congress to address our longer terms needs and requirements. I think the fact of the matter is it probably would be easier to do intelligence planning in the department if it weren't for the fact that you're constantly in the middle of dealing with about three budgets--the one that that you're currently trying to implement, the one that's currently pending on the Hill, and the one that you're working internally to prepare to submit within a few months to the President and then to the Congress. So I think the principle is a sound one. And even with the changes that are currently underway in the world, that long term the desirability of going to a two year budget makes a lot of sense.

A number of members of Congress have supported this in the past. The authorizing committees have attempted to move in the direction of a two year budget. We've never been able to get that transition completed. What we're asking for and calling for again is something Congress has previously said they were interested in, and that is a two year as opposed to a one year budget cycle.

Q: Mr. Atwood, understanding that a number of determinations are dependent upon negotiations and conditions in the world, how many uniformed personnel can you efficiently draw down over let's say a five year period under the current state of the law, and given the various retirement law changes and years in grade changes that you're seeking in the legislation, what sort of difference would that make in your ability to draw down numbers of uniformed personnel efficiently?

A: I don't know that I can give you a five year period, but over the 1990-1991 period we're talking up to 90,000 military people. That is causing us some difficulty because obviously you do not want to take 90,000 of the lowest rank enlisted people out, that doesn't solve your problem at all. You need to take a slice across the whole spectrum. As you get into the non-commissioned officer ranks, you get into the commissioned officer ranks, and particularly into the flag officers, indeed because of the restrictions now on the time and place and the period over which they have and the fact that you're running into a lot of people in the middle ranks who have, maybe they're in their 10th or 12th year of their planned career of 20 years, you have a very difficult time in letting them go without it being a very punishing thing and one which will destroy morale. So I will tell you this, in the 1991 period we're looking at now, this is going to be a difficult problem.

Q: Would that problem be less difficult if you had the legislative changes that you're seeking?

A: It would be not only less difficult, it would be more responsive to the needs and desires of the people who tried to make this a career we believe, yes.

Q: Mr. Secretary, given the current state of what the Congress is doing in their attention to micro-managing the Pentagon, the Pentagon budget, reprogramming, for example, is it realistic to ask them to give you less detail, less micro-managing from the Congress?

Cheney: They'll certainly not give it to us if we don't ask. There are some classic examples of the kinds of problems we have. I brought just one along today because it came across my desk the other day, where Congress gets into the business of setting a very detailed kind of a requirement. This is a letter I sent to the Hill March 29th. "There was a section in the 1990 Defense Authorization Act that required me to certify that we've approved a test plan for the evaluation of systems for providing AirLand fire support for ground combat force systems that is sufficiently flexible to allow for an evaluation of any current system and any feasible future system for such purpose and has approved a test plan for the evaluation of

both the upgrade program proposed for the F16 aircraft and the upgrade program proposed for the A-10 aircraft for close air support including night time operations". That's my paragraph explaining to the Congress what it is I'm trying to do here.

The significant fact is that I was required to certify that any fixed wing aircraft operated after July 1st of this year, at the National Training Center, Fort Irwin, California, would be fully integrated into the instrumentation system to the same extent as attack helicopters are integrated into the instrumentation system. The Department has examined alternative methods of integrating fixed wing aircraft by July 1, 1990, but no affordable plan will provide a significant near term improvement. Therefore, in accordance with the law, I am directing that fixed wing aircraft will not operate at the National Training Center after July 1, 1990, until they can be integrated into the range instrumentation system.

The bottom line is now we're not going to be able to use fixed wing aircraft at the National Training Center at Fort Irwin because of the statutory provision, and the only way I can get it fixed and be in compliance with the law and do the full-up exercises that we've done at Fort Irwin over the last several years, is to get Congress to repeal the statutory provision that prohibits my operating those aircraft at that site without instrumentation. It is a level of detail that is not helpful, obviously, in terms of trying to run the department, and from the congressional standpoint there are a lot of ways to correct that problem without the result we have now, and the result we have now is we're going to have less capable training than would otherwise be the case. That's the kind of micro-management I think is not helpful.

Now admittedly, there are a lot of pressures on the Hill. I'm well aware of them since I served in the House for ten years myself, for Congress to want to get down to this kind of level, but it's not at all helpful; it does make life difficult; it does have, often times, unanticipated consequences. I think it's in the national interest that we try to find ways to redress the balance that's somewhat out of whack.

Q: Are you optimistic at all? You've sort of proven my point by reading what you just read.

To be Secretary of Defense these days, you've got to be honest.

Atwood: Could I add one thing on that micro-management, because I think it has a ripple effect. If we feel there is micro-management of DoD, then in fact there is great micro-management by DoD of its contractors, and we have to take the first step which is what we're proposing here, to eliminate some of that micro-management of our suppliers.

Q: Back to the personnel thing, if I read two of these provisions here, you're seeking permission to increase the number of officers and the number of E-8, E-9 senior NCO's on active duty. It seems strange at a time when we're drawing down and you're already getting criticism that you're getting top heavy.

A: You're reading from a list that was provided and is an all-encompassing package, but basically what we're after, and we will be presenting this very soon too, is to make it easier for our people to withdraw from those ranks, for us to offer them an easy out. It is not intended to be an attempt to swell the ranks of non-commissioned officers or of commissioned officers either one.

Q: Why are you asking for the current limit on the number of E-8, E-9's, and why is there a provision here seeking permission to exceed by not more than one-half of one percent the number of authorized officers?

A: That is part of a total package and was prepared some time ago. It's just in there, but it is not the purpose of what we're after.

Q: Can you be more specific, Mr. Secretary, about what it is you expect to get out of this legislative relief? Do you want to retire people at 17 years, 16 years, 19 years instead of 20? What is it you're asking for?

A: It is entirely possible that that will be the upshot of it. In other words, let me assume that we have to reduce the number of commissioned officers, let me say. The one way you can go at it, because a lot of these people have a three or four or five year period that they're involved in, you just don't go in and arbitrarily force them out. The alternative is to stop all incoming officers, which is equally bad. What we've asked for is to reduce the period of time they would be in place and to reduce the number of years they'd have to be in a given position before we offer them out. Beyond that, we're looking for flexibility to give them some kind of an incentive award for going out. If you look back at what industry has done, and they've had a lot of experience in this, they will take people who are within two or three years of retirement, they'll offer them an incentive to leave, and at the same time, although we haven't asked for this, the opportunity to earn out their pension rights so if they leave at 17 out of 20 years, this is a possibility that they'd earn it out.

Q: If you cannot give us any one specific example of what you're looking for, say a 17 year retirement today, can you tell us when you'll be able to tell Congress what the legislative relief you're asking for this year will cost in this year's defense budget?

A: Yes we can, and we're going to be testifying within the near future, particularly on the DOPMA.

Q: Mr. Arwood, are we talking about severance pay, are you talking about six or eight weeks severance pay, something like that?

A: That's a possibility, yes. That's one of the options we've looked at is asking for severance pay. There is a severance pay provision. This would be an extension of that so they don't have to feel they're out on the street with no arbitrary benefits at all.

Q: Mr. Arwood, are you suggesting severance pay in addition to vesting retirement at something short of the 20 year gate?

A: I would be very receptive to that, and that's something we have to work out with them on the details, but I would not be against severance pay and/or the ability to earn out.

Q: What does that do to the people who are left in who still are going to have to serve to the 20 year gate to be vested?

A: This is something that you obviously would not offer across the board, because you have to be very careful in letting people go that you don't decrease below the levels that you need to man your operation. You do it on a very selective basis.

Q: Mr. Secretary, this effort comes in the middle of some political warfare between the Department and Congress. I wonder if you could give us your assessment of the impact of this on that situation. Do you see this as an olive branch at this moment? Or fuel on the fire?

Cheney: A couple of things to keep in mind. First of all, this effort began last summer. One of the reasons we are going with the legislation now is because we just got it through the OMB clearance process. We drafted legislation within the department. Jack Marsh was heavily involved in the effort, the former Secretary of the Army, and a number of other people. Once they got a draft package put together, I signed off on the basic provisions we thought we wanted in it. That went over to OMB some months ago. Then it had to be worked within the inter-agency process -- OMB, the Office of Personnel Management, etcetera. It's just recently, within the last couple of weeks, that they've signed off on it so that we now have it cleared through the Administration's processes so we can send it forward to the

Hill. So to that extent the timing is purely coincidental. It's not being offered now because of the controversy with respect to Congress over the defense budget.

The fact of the matter is there is a lot of controversy over the defense budget this year. My experience has been that that's been true in the past but it's even more pronounced now, I think, because of the changes we've seen in the world; because we continue to be in a position where it's sort of a zero-sum game, if you will. You've got to hit the budget mark and the Gramm-Rudman statute means that whatever increases you're going to have in one area of the budget have to be made up by decreases in some other area. As the biggest pot of discretionary money in town, DoD gets caught up in that debate.

I don't find the relationships particularly contentious at this point. Obviously, there are some differences. There are some words being fired back and forth, but I think most of it's fairly substantive and not personal. Having served 10 years in the minority in the U.S. House of Representatives, the treatment I receive now is gracious by comparison. (Laughter)

Q: About 90 minutes or so ago, Senator McCain and Senator Cohen came to the Senate studio and offered up a plan and basically said we need to cut the defense budget about double what the Administration has offered to do so far, instead of two go to four percent. These are moderate Republicans who are well respected in the defense community. What do you say to that plan and what do you say about calls for greater cuts?

A: I haven't seen the plan. I'll be happy to look at it. John McCain and Bill Cohen are both able, responsible Senators. So certainly we'll want to study it.

With respect to the cuts, what we put forward is, I think, a responsible plan that does in fact respond to the developments we've seen in the world in the last six months, does exercise due prudence and caution given the uncertainty that exists about the future, and given the nature of the beast, of the fact that a lot of our budget's driven by prior year commitments and obligations, given the need to preserve the morale of the force, and keep in mind that we're trying to build down an all volunteer force, we think does it the way it ought to be done. That's our best judgment--mine, Don's and ultimately the President's -- on how we ought to proceed. I've never been in a situation with respect to the defense budget where you had unanimity on those points. Congress never says great, we'll take your budget, bang, here we go.

The debate continues apace. There will be various and sundry views as to how it ought to be handled. The budget we've sent up there is the one we think is the right one. Now it's up to Congress to respond.

Q: You don't consider this the kind of micro-management which you don't like to see from Congress?

A: No, I think it's perfectly appropriate for members of Congress, especially members of the Armed Services Committee, to have ideas about what our overall thrust ought to be. Congress has a major role in control of the purse strings, a constitutional role to authorize appropriate funds for the Department. I wouldn't call that micro-management at all. That's part of the legitimate exercise of their responsibilities. Micro-management is the kind of thing I just read.

Q: They call it macro-management, Mr. Secretary. They say there is a vacuum right now. The Administration is -- in terms of setting strategy. They said we've got to get away from setting budget numbers, arbitrary numbers, and then trying to fit the military needs into that. How do you respond to a criticism like that?

A: I don't think the criticism is valid. I think there are several places where I would go if I were interested in strategy. I would look at some of the speeches I've made in recent months. I would look to the President's submission of the National Security Strategy report that went up just a few weeks ago to Congress, a 32-33 page public document that lays out a broad overview of what we think our requirements are going to be in the future. I'd look at the Net Assessment, a top secret document that goes into great detail in terms of how we currently view the world, prepared by the Chiefs. General Powell spent a great deal of time on it himself. We will soon release a public version of that as well. There is the National Defense Planning Guidance that I passed out to the services in terms of planning for the '92-'97 POMs in terms of the assumptions that we made in there with respect to what the world is going to look like five or six years from now. This notion that there is no strategy is just not valid. People may not like it or they may feel they want to move immediately in 1991 to harvest the so-called peace dividend, that they want to go forward more rapidly than I think is appropriate, or that they have got some other priority that they'd rather spend those funds on. But to suggest there is no strategy simply isn't valid.

Q: One follow up, Senator McCain said that one thing he thought would save a lot of money would be to shift from a triad to a diad. He thinks the land-based missile system is very expensive to implement, MX and the whole bit...

A: That's a fundamental change of policy, and I think it's a mistake. I believe in the triad. The President believes in the triad. I don't see that it's in our interest at this point to shift to a diad. There's just a fundamental difference of opinion.

Q: On the legislative package, does this include a provision calling for dropping a GSA oversight board of contract appeals of DoD contracts?

Atwood: No, we do not propose that. One of the things we want to be very careful of is the fact that to avoid micro-managing of our subcontractors is one thing, but to give up the right to go in and audit and the right for them to appeal that audit is another. We do not want to have any part of that. We want to retain the right of the government to go in and audit as they see fit, to go in and do all of the checking as they see fit, and the right of the contractors to appeal that. What we feel we need to give up is this daily, full-time cadre of people who live in all of our contractors checking almost every facet of their business. That's, in a sense, when we look at Congress, it's the same thing we're asking there. We do not want Congress to give up the prerogative they have of working with us in establishing our budget, establishing the force structure and what we should do. What we ask for is relief from the daily operation that goes on.

Q: In terms of the desire for more commercial-like operations, is there more involved than this? Is there more involved in that than simply reducing this monitoring you're going to be doing?

A: Yes. I think if you look at this, now coming from industry I had to look at it a little differently when I got here. In terms of commercial practice in industry, we are dealing with company funds, so that if we have suppliers who do not fulfill the quality or have a history of it we can arbitrarily make a decision that they are non-responsive and are not going to permit them to bid, and that's the end of it. There's no right of appeal for it. When you deal with the Department of Defense funds we're dealing with taxpayers' money, and everyone out there feels they have a right to at least compete for it, and it's a vastly different situation. In order to forbid them from competing you have to have almost an ironclad court case that they are non-responsive or they are not capable of doing it. It's a vastly different element. On one had you can be fairly arbitrary because you're dealing with your own money, but in this case we have to be very rigid about how we handle it because we're dealing with the taxpayers' money.

Q: So what are you going to do about that beyond reducing this monitoring?

A: We're asking for legislation which will permit us to on a more realistic basis determine who get our contracts, by taking into account the performance these suppliers have had, how responsive they've been to our problems, what the quality of their products is, and what the capability of the products they service as well as price. And if you will, conduct our competitions based on an honest matrix analysis of these companies so that cost is one factor but one factor only. As I said, today, unless you can declare a contractor or a bidder as being not eligible, and that's a very serious move to make in the government, but unless you can do that you're almost duty bound to take low price.

Q: Would a designation of non-eligibility be an encouragement for those contractors who are eligible perhaps to bank a little more because of their reputation?

A: I don't think that's quite the case. There are contractors who are eligible, in other words we cannot declare them ineligible, who perhaps do not provide quality, do not provide on-schedule deliveries, and this will encourage them rather than publishing a list that says you're not eligible. It's very difficult to prove. You get into a very detailed legal entanglement if you do that.

Q: As you go through your whole package and as you look in those areas where there is dollar and cent savings in terms of the way you're able to manage your money, and as you look to the other areas where cost may increase a little bit, for example bonuses and incentives for early retirement and the like, what's the bottom line on that? Is there a substantial savings there or not?

A: We feel it's very substantial savings. In January we proposed and incorporated in our budget and in our five year plan about $39 billion in savings, and we're willing to budget that. As we look at the next two year budget cycle and the four year planning cycle after it, I have ever expectation based on what we're doing plus this, that we'll be able to increase that amount significantly.

Q: Secretary Cheney, by now you should be well apprised of the results of the review of four major aircraft that you ordered a few months back--the C-17, A-12, B-2, and the ATF. I wonder if you could share your thinking with us on those systems, particularly the B-2?

A: I don't plan to announce the results here today. We are part way through the review. Don and I spent three hours this morning and broke to come down here and do this press conference and this afternoon we'll go back into the review again. I think they've done a good job. John Betti has sort of headed up the effort for us. We've been through now the process of reviewing the threat and intelligence estimates about the kind of world we're going to be trying to deal with in future years. We've reviewed the A-12. This morning we worked on the ATA and just started on the ATF before we came down here. So we're not all the way through the process yet and probably won't be for another week or so.

I don't want to prejudge the outcome. At this point these are all major programs. There's a lot of time and energy already invested in them. I've asked, as you know, for some other reviews as well. We're looking at the LHX, the Army helicopter program this week. Don and I have directed that we also go do a review of the SSN-21 and the DDG-51. These are sort of the big ticket procurement items that we can see down the road that the department's going to have to go forward with. I'm in a position, given the assumptions we're making about the future declines in the defense budget, that we literally have about 10 pounds of program and about a 7 or 8 pound budget, and somehow we've got to figure out a way to fit all that in. To do that I wanted to go back and review each one of these major programs, review their requirements, see what kinds of systems they're replacing, look at various and sundry options to satisfy those requirements. Out of that process we will have

some decisions within the next few weeks. Those will feed into the 92-97 POM process and to the extent that they have validity or relevance for the current deliberations in Co ngress on the '91 budget, then we'll make that information available there as well in terms of our recommendations to Congress.

Atwood: Can I add just one item to that, because I was quoted recently as saying this is the most exciting time I can ever recall personally, and I was quoted as saying in the history of DoD. That isn't quite true. I'm not the whole history of DoD, obviously.

But what we're pulling together is the POMs and they will be submitted, as you probably know, the end of this month. We are completing the review of these major programs, the aircraft programs, now the destroyer and submarine programs, the LHX, the helicopter program. We will be factoring those studies into the review of the POM against our defense planning guidance--It's the Program Objective Memorandum. This is produced by the services in response to their attempt to tell us what they need in order to meet the defense planning guidance. So we're going to tie all of that together in the months of May and June. I do not anticipate a press conference to say we have decided on the A-12 and this is the result of it. It will be an evolutionary process, very iterative as we put together the program objective memorandum and based on our defense planning guidance and these studies and the fiscal constraints we see.

A: One other point if I might. It may be, for example, that in wrestling with these programs that we might want to make a decision to trade force structure for modernization. We may want to keep a program at the expense of having to give up several units of whatever it is you want. Those kinds of tradeoffs get made in the POM process. The normal cycle is that we go through the POM responses that will come in within the next month from the services to Don and myself. We review those. We go back and forth, have several exchanges over the course of the summer. Ultimately all of that feeds into the budget that goes to the President next fall and to the Congress next January for the '92-'97 cycle. That's the normal process and that's how these will be handled.

Now there may be some decisions that are made in connection with this review of aircraft program, you asked specifically about the B-2 for example, that you'll want to feed into the '91 process. If there are decisions that we make that have relevance for 1991 then we will certainly convey those to the Congress and say we recommend X with respect to a particular program.

Q: On that point, those in Congress who are a little more patient and willing to take the cuts in the defense budget -- further down the line, are asking for some guidance on how they can get those long term savings. Senator Nunn particularly has been nagging you for some way to show how you're going to meet the five year reductions that you've projected. If you don't make some basic decisions on these big buck weapon programs, how are you going to be able to provide them guidance to save the money they need for the long term to head off the stampede to just simply cut, you know, arbitrarily which means basically O&M and personnel.

A: We do plan to make decisions on those items. That's what this process is all about.

Q: But will it be there in time for them before they pass the '91 authorization?

A: As I said, to the extent that it has relevance at all for '91, certainly. We are working now to get down to the top line the President's given us for the out years. But some of that, it would have been a relatively simple proposition to sit down last January and just start whacking away at the budget and make the top line. That is not hard to do. You can say we'll throw that out, throw this out, cut the Army by X percent, etcetera. It's easy

to get all that to come out. But I do in fact want to proceed on an orderly basis. We've got the POM process set up. That's the normal way for services to look at their requirements and to have an opportunity to consider that. These are very big decisions. When you sit down and look at that aircraft review you're talking about what kind of aircraft we're going to have in the inventory for my successor three or four times removed. We're looking at the force structure in the year 2025 or 2010, for crying out loud. The F-15's in the force now rolled out in '74. I don't want to make those kinds of decisions on an ad hoc basis. I don't want to do them without adequate consultation within the department or with watching the evolution of international events or without having a CFE agreement signed or without having a START agreement signed.

There's a nice orderly process here that we can go through. Nobody in the Congress has even marked up a bill yet, and probably won't for at least a month. Then the House Armed Services Committee will begin. There is no budget top line yet from the standpoint of the budget committees. As we go through the process this summer, as we get additional information that has a bearing on 1991, we are eager to provide it to the committees. I was asked that question when I went up and testified in January. We assured them then we wanted to work with them and we'll continue to do that. We're not trying to keep anything from anybody, but we do need to go through this on an orderly basis.

This is, I might point out, the first time if Congress does in fact make decisions based on a long term five year projection, it will be the first time they've ever done it. They're always right down looking at 1990 or 1991 or what's going to happen this fiscal year. So I'm not unsympathetic at all to the need for our views of what ought to be done on a long term basis. We will provide that to them as it's developed. There are extensive processes underway within the department to develop ex. ctly those pieces of information and that kind of analysis from a strategic standpoint in terms of what our structure ought to be, in terms of where we're headed down the road in terms of procurement and R&D and all those other things that are an important part of our military capabilities. But I don't think it makes sense.

I think it would have been stupid, I think I would have been subject to a lot of criticism if the wall went down in November, the Germans held free elections in March, and in April we produced a new ten year plan for the Department of Defense. We are going through a period of major changes in the world. They're very positive changes. They have major consequences for the department. We have, I think, good procedures underway to draw upon all the talents of the people in the building to make the adjustments that are required. We can do that through a normal, orderly, careful, thoughtful process, and that's exactly what we're doing.

Q: Do you perceive submitting parts of '91 or just doing it on a piecemeal basis, program by program, as a result of the reviews you've undertaken?

A: I haven't really decided. I'm inclined to do it as Congress works through the process. I am now in touch with the various members of the committees, talk to them on a regular basis. I had a meeting with the Chairman and ranking members of all four committees Tuesday of this week. As they go through the process of trying to set the top line on the budget committees, I'm in touch with members on both sides of the aisle in both houses. As we develop information about a particular system or as they wrestle with what will be the consequences of a particular kind of reduction here, we're interacting with them continuously That's what we did last year, and I'm sure that's what will happen again this year.

We have not made a decision to send up a "revised" budget. As we get through the process of reviewing programs and developing new information, we'll be happy to provide it to Congress.

Q: Mr. Cheney, you indicated moments ago that as part of this briefing you had an update on the Soviet threat. Could you enlighten us as to any information you've learned that you've not disclosed before about that threat?

A: This dealt in some detail at a specific level with the threat that's relevant in terms of trying to assess what kind of capability you need to be able, for example, to penetrate air spaces; how sophisticated the Soviet air defense system is likely to be in the future; the extent to which, as you look at other parts of the world, you would face a threat that is equal to or greater than the one we're faced with today. That's the sort of bottom line analysis of trying to decide what your requirements are in terms of what kind of aircraft you want to buy, how much you may want to invest in various kinds of capabilities.

Q: On the upgrading, continuing to upgrade your air defense system which would be a justification for the B-2 bomber?

A: At present, yes. What we see is continued improvement in Soviet air defenses.

Q: On the B-2, Mr. Secretary, you said that you anticipate you will continue to support the program. On Capitol Hill we're seeing more and more people come out and say they're against it--Cranston, Leahy, today Senator Cohen said he was against it, Aspin, Dickinson's a little shaky on the project. You're from Capitol Hill, you spent time there, you know the political realities of what this means. Do you still think there's a chance this could squeak through Congress?

A: I don't know what more I can tell you. We haven't finished the review yet. When we finish the review we'll give our best advice to Congress as to what, if any, change ought to be made in the current program. Congress just got through approving a few months ago the B-2 program that's out there now that's in the budget. That's what's currently pending. Again, it would be silly to set up a review and go through the whole review process and come down here and announce my views without having heard that presentation. I haven't heard the presentation yet.

Q: Both Senator Nunn and Mr. Aspin have seen the classified Joint Chiefs net assessment, and they both seem to say that, Mr. Aspin more particularly, that there may no longer be a need for theater nuclear forces in Europe. Is that what the classified version says? That it's different from the unclassified?

A: No, that is not what it says.

Q: Can you tell us more about it? What it says.

A: It's classified. (Laughter)

Q: Last week General Perroots wrote in an article that the Soviets would be soon providing on some large scale defensive weapons, laser systems, and other things on the world market, a move that would, in his words, transform the nature of warfare in many respects. Do you agree with his assessment? And if so, to what extent have defensive systems and the SDI being incorporated into this entire review, and from that standpoint?

A: I haven't seen General Perroots' paper or report. At risk of being accused of looking for threats now that the Soviet threat is going away, the fact of the matter is that several levels of potential conflict you have to anticipate, I think, that in future years the threat that we will face in various places in the world will become more sophisticated than it is today. While obviously we focused in the past on the Soviets as our prime potential adversary, and they are likely to remain for the foreseeable future as our number one adversary in terms of their own military capabilities. All you have to do is read the newspapers to see the extent to which indeed there is a proliferation of sophisticated military technology to other nations in the world.

The intelligence reports reinforce that notion. What's available publicly, for example, just within the last few days, has been the Iraqi launch of a ballistic missile; the Iraqi effort to acquire triggering devices for nuclear weapons; the threat by Sadam Hussein, the head of the Iraqi government, that he's prepared to wipe out half of Israel, if necessary, to respond and retaliate with chemical weapons. Those are major concerns.

When I look at long term, 10, 15, 20 years down the road, it seems to me that one of the things the United States is going to have to be prepared to deal with is the proliferation of that kind of sophisticated technology --weapons of mass destruction -- around the world. In light of that, I come to the conclusion that it is important for us to continue to explore strategic defense. That they offer the best opportunity of being able to defend the United States, and not only the United States but our allies and forces -- U.S. forces deployed overseas against that kind of threat. I think that makes sense. I think that's a reasonable kind of requirement to keep in mind, and of course today we have zero capability to defend against a ballistic missile attack against the United States or one of our allies.

That doesn't mean that you're talking about numerous countries in the Middle East having intercontinental range ballistic missiles in the near future. But what we do see is a lot of countries acquiring short range and intermediate range systems. They're not generally very accurate, they aren't nearly as good as the kinds of systems we deploy. They have limited capabilities. But that capability will grow, and I think it's important for us to keep that in mind. This is true not only in this area, but also with respect to conventional systems. I think you can anticipate 15 or 20 years down the road that the kind of air defense capabilities you see in the Soviet Union may well be exported to other places. You can go to the Middle East today and find nations like Syria, Iraq, that have similar capabilities.

So the proliferation of technology that we've seen, the increased access to technological developments across the entire spectrum of human activity around the world has as one of its by-products the fact that more and more countries will become more and more sophisticated in terms of their military capabilities and our planning must take that into account.

Thank you all very much.

Mr. Williams: Let me just add one other quick note in response in part to Ben Schemmer's question about this notion that the changes are going to increase the number of E-8s and E-9s. Remember, or maybe it was Otto's question. The point here is that we're seeking relief from the DOPMA, from the Officer's Management Act. This will allow us to exceed numbers for how many people you can have in given personnel categories. That's a number given to us by Congress. We're looking for a little management flexibility here. We want to be able to protect people that have certain special skills, for example nurses in certain ranks, and if they would happen to fall into a bulge in the personnel system, then we would have to say I'm sorry, we can't keep you because we've already maxed out in that category. So you've just found one example of where we're looking for flexibility. Don't look at that as a way of just increasing E-8s and E-9s.

END

The following contains prehearing questions submitted to the Department of Defense by Senators Bingaman and Wallop on March 29, 1990, and the answers submitted by the Department of Defense on April 23, 1990. In the questions, all references to sections of statutes refer to the National Defense Authorization Act for Fiscal Years 1990 and 1991 except as otherwise noted.

QUESTION:

1. Streamlining Reporting Requirements

Section 811 streamlined certain reporting requirements in the Selected Acquisition Reports, the Defense Acquisition Executive Summary, and internal DoD unit costs reports.

a. Have these changes been incorporated in all relevant Departmental issuances, including those of subordinate components?

b. Are these new procedures currently in use?

c. What implementing actions, if any, remain to be undertaken?

d. Do you have any further recommendations for streamlining the reporting procedures covered by Section 811?

ANSWER:

a. On December 18, 1989, we issued updated Instructions on the Selected Acquisition Reports (DoDI 7000.3) and on Unit Cost Reporting (DoDI 7220.31). These updates implemented the consolidation of Unit Cost Exception Reports (UCERs) in the Selected Acquisition Reports, the substitution of unit cost deviation margins for SAR exception reporting, and the insertion of the Service Acquisition Executives into the unit cost monitoring process. The two updated Instructions, which were effective immediately, will be incorporated in the new DoD Directive 5000.1 and its companion documents governing the overall major acquisition process.

   We will soon issue a new Instruction for the Defense Acquisition Executive Summary (DoDI 5000.50). It will implement consolidation of quarterly internal Unit Cost Reports in the DAES, as allowed by last year's legislation.

b. The December 1989 Selected Acquisition Reports included Unit Cost Exception Report (UCER) information for the AMRAAM and Sensor Fuzed Weapon.

c. All of the mandatory statutory provisions have been implemented. However, the revised statute permits, but does not require, the DoD to consolidate the quarterly internal Unit Cost Report (UCR) requirement with other internal reports. As outlined above, we intend to do this with the Defense Acquisition Executive Summary (DAES). We plan to phase in the consolidation of the Unit Cost Reports in the Defense Acquisition Executive Summary (DAES) in the May through July DAES cycles. If successful, the June 1990 internal Unit Cost Reports will be the last separate reports. We have completed new DAES software to permit the Program Managers to include UCR data in their DAES reports and expect to distribute the software with the updated DoD Instruction 5000.50 in the very near future.

d. We appreciate the support provided by the Congress in approving last year's acquisition reporting streamlining proposals. Future streamlining will be

largely within DoD's existing authority to implement, without further legislative changes. For example, we are currently considering ways to streamline the Defense Acquisition Executive Summary (DAES). We are also pursuing automation of the acquisition reports to facilitate preparation of Defense Acquisition Executive Summary, Selected Acquisition Report, and acquisition program baseline. The first version of the Consolidated Acquisition Reporting System (CARS) software was introduced to 35 program offices in December 1989. We will provide improved versions later this year, with the expectation that all program offices will use the software to prepare the December 1990 Selected Acquisition Reports, as well as the Defense Acquisition Executive Summary.

There are two areas that will require additional Congressional support. By early June, we plan to submit proposals on the following items for your consideration.

First, there is a need for two technical corrections to last year's reform legislation.

(a) As written, the current law requires us to submit a March Selected Acquisition Report (SAR) for any program for which a unit cost breach is determined after the President's Budget is submitted, even though the December SAR is not submitted for another 60 days. Consequently, we can have a situation where if a breach occurs before the December SAR is submitted, all breach information could be included in the December SAR, but is deferred to the March SAR. The Army's ATACMS and Family of Medium Tactical Vehicles programs are good examples. Both show breaches in the December 1989 SAR but must also submit March 1990 SARs to reflect the same breaches. The need for the second SAR iteration should be eliminated.

(b) The requirement to submit unit cost information to the Service Acquisition Executives (SAEs) within seven working days after the as of date inhibits efficient use of the Defense Acquisition Executive Summary (DAES) as a reporting vehicle. Thirty calendar days would provide for more effective reviews and breach determinations by the SAEs before the DAES must be forwarded to OUSD(A).

Second, we anticipate submitting recommendations for improvements to the Selected Acquisition Report (SAR). We are working on a proposal to generate a one to three page summary of each SAR which retains all of the current detail for those who have a need for such detail.

2A. MASTER AGREEMENTS:

QUESTION: Section 812 authorizes the Department to establish a test program for the acquisition of advisory and assistance services needed on a repetitive basis using master agreements awarded through competitive procedures. What is your schedule for issuance of proposed and final implementing regulations?

ANSWER: The Defense Acquisition Regulatory Council delayed deliberations to consider comments that industry requested be considered during initial drafting of the proposed rule. The Council expects to publish a proposed rule in the Federal Register for public comment by mid-June. After the comment period, the Council will analyze public comments and develop final rule language. We anticipate a final rule by December 1990.

2.B. MASTER AGREEMENTS

QUESTION: It has been reported that the Air Force Aeronautical Systems Division (ASD) awarded a contract to several contractors for undetermined studies that will be needed in the future. Labor rates and other terms were agreed to in the contract. When a study is needed the participating contractors submit estimates of the cost to complete the study ASD will then make the selection.

(1) What is the relationship, if any, between the ASD procurement technique and the master agreement test authority?

(2) How does the ASD procurement technique satisfy the publication and competition requirements of the Competition in Contracting Act?

ANSWERS: Question no. 1: There is no relationship. The six ASD awards are indefinite quantity, time and material contracts competitively awarded after full and open competition. They were awarded in January 1990 under the provisions of current procurement law and did not use the Section 812 provisions regarding the use of master agreements.

Question No. 2: This acquisition was synopsized in accordance with FAR Part 5.201 and the six awards were made after full and open competition in compliance with the Competition in Contracting Act. Announcement of the awards required by FAR 5.303 was also accomplished. To date no tasks have been issued on any of the contracts.

3. CICA APPROVAL AUTHORITY:

QUESTION: Section 817 simplified the approval authority for contracts implementing certain international agreements, and Section 818 authorized greater delegation of authority to approve certain action. Have these changes been incorporated in all relevant Departmental issues, including those of subordinate components?

ANSWER: We have issued a final DFARS rule that specifies a lower approval level for procurements where we do not seek competition because of international agreements. The senior procurement executive is the approval authority on all proposed contracts over $10 million when a limitation on competition is proposed. The senior procurement executive, at his discretion, may delegate approval authority for contracts up to $50 million.

QUESTION #4

FACT SHEET

SUBJECT: The Department of Defense (DoD) Procurement Technical Assistance Cooperative Agreement Program (PTACAP)

BACKGROUND:

o The FY 90 DoD Authorization Act provided $9.0 million for the DoD PTACAP. The legislation provided:

oo $8.4 million to fund programs (hereinafter referred to as the General Program) for State Governments, Local Governments and Private, nonprofit organizations (hereinafter referred to as eligible entities).

oo $600,000 to fund programs (hereinafter referred to as the Indian Program) for Tribal Organizations and Indian Economic Enterprises (hereinafter referred to as eligible entities).

oo The value of assistance furnished by the DoD to any eligible entity to carry out a PTACAP could not exceed $150,000 for programs providing less than statewide coverage and $300,000 for programs providing statewide coverage.

oo At least one PTA center would be funded in each DCAS Region.

DISCUSSION:

o Proposed procedure for implementing the FY 90 programs was published in the Federal Register on 7 February 90 and only one comment was received which did no object to the procedure.

o The programs were synopsized in the Commerce Business Daily on 9 February 90.

o The solicitations for the FY 90 General and Indian programs were issued on 26 March 1990 with a 10 May 90 closing date for receipt of proposals by the DCASRS.

o Preproposal conferences were held as follows:

| | | | |
|---|---|---|---|
| oo | Cleveland, OH | 2 April 90 | General Program |
| oo | Philadelphia, PA | 4 April 90 | General Program |
| oo | Phoenix, AZ | 10 April 90 | Indian Program |
| oo | Los Angeles, CA | 12 April 90 | General Program |
| oo | Atlanta, GA | 17 April 90 | General Program |

o All proposals for the FY 90 major and Indian programs will be evaluated by a centralized evaluation panel which will convene at this Headquarters on 4 June 1990.

o Cooperative agreement awards will be made competitively on or before 31 August 1990.

oo Each cooperative agreement will be awarded for a 12-month period unless extended.

CONCLUSION: None

RECOMMENDATION: NONE

PREHEARING QUESTIONS FOR THE DEPARTMENT OF DEFENSE

QUESTION 5.

QUESTION

Sections 802-804 contained provisions requiring impartiality in operational testing, revising the definition of low rate initial production, and modifying the reporting requirements with respect to live fire testing. For each of these provisions, please describe the manner in which the Department has implemented the law and discuss any issues that have arisen with respect to implementation?

ANSWER

Because the 5000 series directives are currently in revision, the provisions of the law cited above have initially been promulgated by a 1 March 1990 DOT&E memorandum. This memorandum was forwarded to the Service Acquisition Executives (SAE's) to briefly explain the latest legislative changes. It also directed the SAE's to review these provisions and report their impact back to DOT&E. Regarding any issues which have arisen, initial concerns are that the impartiality in testing provisions may limit Department access to essential private sector expertise. The other provisions mentioned in the question are, in the main, codification of procedures already in place within the Department, consequently, we expect any impact to be minimal. Nevertheless, we have asked the Services to review the impact of these new provisions of law and reserve final judgment on issues until their concerns have been assessed. Responses are not anticipated until early May.

6. CERTIFICATE OF INDEPENDENT PRICE DETERMINATION:

QUESTION: What is the status of the proposed revision to the Federal Acquisition Regulation required by Section 821?

ANSWER: We expect a final rule to be published in the Federal Register in mid-May which will require foreign suppliers to submit a certificate of independent price determination.

7. UNIFORM RULES ON DISSEMINATION OF ACQUISITION INFORMATION

QUESTIONS:

a. Please describe your timetable for issuing as a final rule the single, uniform regulation regarding dissemination of, and access to, acquisition information required by section 822?

b. What administrative, civil, and criminal penalties will be available to deal with violations of these rules?

c. Does the Department agree with the views of the Inspector General that the rule should permit the broadest possible dissemination of information? If so, what specific steps do you plan to take to encourage such dissemination while at the same time acting to deter, detect, and take action in response to wrongful dissemination of information?

ANSWERS:

a. The Office of the USD(A) has prepared an interim DoD Directive on Release of Acquisition-Related Information. After the DoD Directive is signed, it will be published in the Federal Register for public comment. The register notice will state that the directive will be incorporated into the DFARS as an appendix, as required by the law. We expect the directive to be signed shortly.

b. A wide range of administrative, civil and criminal penalties are currently available. These include contract termination, suspension and debarment of a contractor and its individual employees, civil suits and monetary recovery, as well as criminal prosecution under the statutes successfully used by the Department of Justice in the Ill Wind and other investigations.

c. It is the policy of the Department of Defense to make the maximum amount of acquisition-related information available to the public, within the constraints of applicable law, and to respond promptly to specific requests from the public. We will incorporate this policy in a DoD Directive and the DFARS to ensure the widest possible dissemination.

**8. Commercial Products** - Section 824 requires that the Department take specific actions to improve the acquisition of commercial and nondevelopmental items.

**Question 8a.: What is the status of regulations required to be issued under section 824(b) and (c)?**

**Answer:** Section 824(b) required the Secretary of Defense to:

1) develop a simplified uniform contract for the acquisition of commercial items by DoD and require that the contract be used to the maximum extent possible.

**Status:** A draft standard contract has been prepared and is undergoing internal coordination and refinement. The statutory deadline for issuing draft regulations for public comment will be met.

2) require the use of a modified inspection clause with streamlined inspection procedures for DoD contracts awarded to a contractor meeting certain quality related criteria.

**Status:** DoD has submitted a proposed revision to the Federal Acquisition Regulation (Part 46) which allows greater reliance on contractor inspection for commercial items. The proposed rule does not preclude the use of higher level inspection when it is in the best interest of the Government. FAR 46.202-1(b) lists four factors the contracting officer should consider in determining whether reliance on the contractor inspection is prudent. They are:

a. The nature of the supplies and services being purchased and their intended use,

b. The potential losses in the event of defects,

c. The likelihood of uncontested replacement or correction of defective work, and

d. The cost of detailed Government inspection.

3) require the use of standard commercial warranties in DoD contracts for commercial items.

**Status:** Standard commercial warranties are addressed in the draft standard form contract. The guidance on use of the contract will instruct the contracting officer when it is appropriate to use such warranties.

4) revise certain regulations governing cost or pricing data requirements for commercial items.

**Status:** DoD has submitted a revision to the Federal Acquisition Regulation (Part 15 and 31). The proposed rule should be published for public comment by May 1990.

Section 824(c) called for an analysis of impediments to the acquisition of nondevelopmental items (NDI) including as a minimum:

1) A decision on the expansion of regulations governing the acquisition and distribution of commercial products (FAR Part 11) to address the procurement of NDI.

**Status:** We have not completed our analysis of this issue. At this point, however, we think it will be efficient to maintain a separate set of regulations for the commercial product subset of NDI. Practically, NDI applies to weapons systems, and we think that changes to regulations governing acquisition planning (FAR Part 7) may be more appropriate to address NDI acquisition.

2) A decision on changes to regulations governing specifications, standards, and other purchase descriptions (FAR Part 10).

**Status:** DoD has submitted a proposed change to these regulations, which minimizes the use of military specifications and emphasizes the preparation of "functional" product specifications. This change also incorporates the statutory preference for NDI.

3) A decision on requesting technical data on commercial items.

**Status:** Our analysis is not completed.

4) A decision on increasing the Secretary's authority to exempt defense contracts for commercial items from various requirements.

**Status:** We are in the process of investigating and defining the Secretary's authority in this area.

**Question 8b.: What is the timetable for completing the analysis required by section 824(c)(1) and submitting the plan of action required by section 824(c)(2)?**

**Answer:** The analysis will be completed by June and the plan of action by August of 1990.

**Question 8c.: On the basis of analysis performed to date, do you believe that is likely that legislative proposals will be submitted under section 824(c)(2)? If so, do you intend to submit such proposals in time for review and action by the Congress during this session?**

**Answer:** Based on previous analyses of statutory impediments, legislation was drafted as part of the Secretary's Defense Management Report effort and submitted this session. It is unclear, at this stage of analysis, whether any further legislation will be submitted.

**Question 8d.: What actions have been taken, and what plans have been made for future actions, to meet the training requirements under section 824(d)?**

**Answer:** We have contracted for development of a two-day course on NDI acquisition, to include NDI feasibility investigation and analysis, market research, specifying requirements, solicitation, source selection, quality assurance, and logistics support of NDI. There will be three variations of the basic course for buyers, spec writers, and logisticians. We plan to fund this course at OSD initially and offer it on-site at key locations. The first offerings will be late in 1990 and plan we plan 20 offerings the first year.

9. Contract goals for disadvantaged small businesses

(a) What steps have been taken to enhance the Department's efforts to meet the five percent goal?

Through the implementation of the various preference programs for small disadvantaged businesses (SDB), the Department of Defense has achieved a significant increase in awards to SDBS over the previous fiscal year. In FY 1989, DoD awarded a total of $120 billion in prime contract awards to all U.S. businesses. Of this amount $4 billion or 3.3% was awarded to SDBs. This represents an increase in awards to SDBs over FY 1988 which was $3.6 billion or 2.8% respectively. Under the subcontracting program, DoD prime contractors awarded a total of $58 billion in subcontracts. Of this amount, prime contractors awarded $1.3 billion or 2.3% to SDBs. This is a $267 million increase from FY 1988 in which SDBs were awarded %1.9 of total subcontracts. We have enclosed a chart illustrating the SDB prime contract program history.

The technical assistance programs for SDBs have further enhanced our ability to make progress toward the 5% goal. We have been successful in providing information to the SDB community on how to do business with the Department of Defense. Approximately 6500 SDBs attended 28 DoD conferences held in 23 states. In addition, approximately 800 SDBs attended the three regional conferences on subcontracting with DoD prime contractors. Thus, more than 7000 SDB firms across the country have been trained with respect to doing business with DoD and prime contractors. Another technical assistance contractor has reviewed over 100 SDB manufacturers and provided them assistance in the areas of production processes and procedures, quality control and accounting. These SDB manufacturers have been referred to DoD buying activities and prime contractors for inclusion on their bidders lists.

(b) Has the Department restructured its data collection requirements in a manner that is responsive to the requirements noted on pages 614-615 of the Conference report (House Report 101-331)?

DoD is currently in the process of restructuring the data collection requirements to comply with the reporting requirements contained on pages 614-615 of the Conference Report.

(c) How has the Department implemented the price differential amendment in section 831(b)?

Since the enactment of P.L. 101-189, we have received one formal complaint about the impact of the ten percent evaluation preference on non disadvantaged small businesses. The industry was petroleum, specifically JP-4 in the bulk fuels division. As a result of the concerns raised by the non disadvantaged small business, we referred the matter to the Defense Fuel Supply Center (DFSC) for a comprehensive review in accordance with the requirements of section 831(b) and the accompanying conference

report. According to DFSC, the available data does not support the premise that non disadvantaged small businesses are being harmed by the operation of the SDB evaluation preference program. DFSC data shows that non disadvantaged small firms as a whole are winning a larger quantity of JP-4 fuel compared with the year before the SDB program took effect. The data also indicated that the volume awarded to the complaining small business increased over volume awarded in 1988. We intend to closely monitor the bulk fuels program after each major procurement to ensure that non disadvantaged small businesses are not generally being denied a reasonable opportunity to participate in this area. With respect to other industries, as complaints arise, the same type of comprehensive review of the data will be conducted in accordance with the law and the conference report.

SMALL DISADVANTAGED BUSINESS (SDB) PROGRAM HISTORY
(Dollars in Millions)

| FISCAL YEAR | DOD TOTAL AWARDS | 8(a) AWARDS | DIRECT AWARDS | PREF. | SET-ASIDE | TOTAL SDB AWARDS | % OF TOTAL |
|---|---|---|---|---|---|---|---|
| 1969 | $37,986 | $8.5 | * | * | * | $8.5 | 0.0% |
| 1970 | $31,777 | $13.4 | * | * | * | $13.4 | 0.0% |
| 1971 | $31,063 | $27.4 | * | * | * | $27.4 | 0.1% |
| 1972 | $34,047 | $72.8 | * | * | * | $72.8 | 0.2% |
| 1973 | $32,479 | $97.7 | * | * | * | $97.7 | 0.3% |
| 1974 | $34,518 | $144.1 | $19.0 | * | * | $163.1 | 0.5% |
| 1975 | $38,213 | $170.3 | $26.0 | * | * | $196.3 | 0.5% |
| 1976 | $49,240 | $279.6 | $27.0 | * | * | $306.6 | 0.6% |
| 1977 | $47,113 | $310.9 | $61.7 | * | * | $372.6 | 0.8% |
| 1978 | $54,359 | $404.8 | $216.3 | * | * | $621.1 | 1.1% |
| 1979 | $58,174 | $550.4 | $358.9 | * | * | $909.3 | 1.6% |
| 1980 | $66,704 | $713.6 | $493.5 | * | * | $1,207.1 | 1.8% |
| 1981 | $87,195 | $1,083.0 | $791.2 | * | * | $1,874.2 | 2.1% |
| 1982 | $102,463 | $1,262.9 | $923.8 | * | * | $2,186.7 | 2.1% |
| 1983 | $121,096 | $1,296.0 | $1,093.8 | * | * | $2,389.8 | 2.0% |
| 1984 | $124,912 | $1,699.2 | $1,010.3 | * | * | $2,709.5 | 2.2% |
| 1985 | $139,587 | $1,779.6 | $1,119.0 | * | * | $2,898.6 | 2.1% |
| 1986 | $136,497 | $1,940.9 | $1,181.3 | * | * | $3,122.2 | 2.3% |
| 1987 | $135,340 | $2,168.7 | $1,147.9 | * | * | $3,316.6 | 2.5% |
| 1988 | $130,815 | $2,162.8 | $1,188.9 | $134.1 | $145.3 | $3,631.1 | 2.8% |
| 1989 | $120,003 | $1,986.7 | $1,136.6 | $576.1 | $298.2 | $3,997.6 | 3.3% |

* = IDENTIFICATION OF PROGRAM PERFORMANCE NOT AVAILABLE.

10. INDIAN CONTRACTING CREDIT:

QUESTION: Section 832 provided prime contractors with credit toward meeting the 5 percent minority subcontracting goal for certain awards by prime contractors that are performed on Indian lands or by certain Indian-owned joint ventures. What actions have you taken to implement this provision?

ANSWER: The proposed DFARS rule to revise the DFARS clause, Small Business and Small Disadvantaged Business Subcontracting Plan (DoD Contracts), will allow credit toward meeting the 5 percent minority subcontracting goal for work by prime contractors that is performed on Indian lands or in joint ventures with Indian organizations. The proposed rule will be published in the Federal Register for public comment by the end of April 1990.

11. Bond waiver authority test program

Section 833 directed the Department to make every reasonable effort to award not less than 30 construction contracts in fiscal years 1990 and 1991 to participants in the Minority Small Business and Capital Ownership Development Program of the Small Business Administration who have been granted surety bond exemptions under the Small Business Act.

(a) Has the Department encountered any problems in identifying suitable projects for utilization of this authority?

(b) How many projects have been identified as eligible for participation in this program?

(c) What data collection measures and evaluation procedures are in place, or will be established, to ensure that a useful interim report can be submitted by March 1, 1991 in accordance with the Conference Report?

Attached is a memo that was sent to the Army, Navy and Air Force advising them of the requirements of section 833. We are unable to answer questions a and b at this time because the Services are not required to report on the implementation of this program until July 15, 1990. We have put into place certain reporting requirements that may be used in the preparation of the GAO report to be submitted by March 1, 1991.

OFFICE OF THE UNDER SECRETARY OF DEFENSE FOR ACQUISITION

WASHINGTON, DC 20301-3061

OFFICE OF SMALL BUSINESS AND SMALL DISADVANTAGED BUSINESS UTILIZATION

8 FEB 1990

MEMORANDUM FOR DIRECTOR, SMALL AND DISADVANTAGED BUSINESS UTILIZATION, OFFICE, SECRETARY OF THE ARMY
DIRECTOR, SMALL AND DISADVANTAGED BUSINESS UTILIZATION, OFFICE, SECRETARY OF THE NAVY
DIRECTOR, SMALL AND DISADVANTAGED BUSINESS UTILIZATION, OFFICE, SECRETARY OF THE AIR FORCE

Subject: The Department of Defense (DoD) Test Program for the Use of Bond Waiver Authority Under the Section 8(a) Program

Section 833 of P.L. 101-189 requires the Secretary of Defense and the Small Business Administration (SBA) to establish a program to test the authority of SBA to waive performance and payment bonding requirements for 8(a) program participants. The Secretary of Defense is required to make every reasonable effort to award under the test program not less than 30 contracts for construction (including repair and alteration of existing facilities) in each of fiscal years 1990 and 1991. According to the conference report accompanying the law, the objective of the test program is to afford qualified 8(a) contractors the opportunity to demonstrate performance capabilities when unable to obtain a surety bond from private sources, even with a guarantee provided through the SBA's Surety Bond Guarantee Program. The conferees anticipate that successful performance of the government's requirements will enhance the firms overall qualifications to obtain bonding for similar work in the future.

The statutory criteria that must be met for a bond waiver is attached. We have also attached the SBA guidelines under which a decision to waive a bond will be made.

In furtherance of the objective of section 833 of P.L. 101-189, we request that each Service issue appropriate guidance to their field offices, to consider, in consultation with SBA, the utilization of the SBA authority provided by section 7(j)(13)(D) of the Small Business Act (15 U.S.C. 636(j)(13)(D)) in situations where contracts for construction (including repair and alteration of existing facilities) cannot be awarded under the 8(a) program due to the inability of the 8(a) firm to obtain bonding. The DoD goal is for each Service to award not less than 10 projects under the bond waiver authority.

During each fiscal year 1990 and 1991, please report quarterly to this office on: 1) the number of 8(a) contracts submitted to SBA for award under the bond waiver test program, 2) the number of

contracts actually awarded under the test program, 3) the dollar value of each contract where a bond was waived, 4) name of contracting activity, and 5) type of construction contract to be performed. We are requesting the first report covering the first three quarters of FY 1990 by July 15, 1990.

Horace J. Crouch

HORACE J. CROUCH
Director

Attachments

12. COMPANY-WIDE SUBCONTRACT PLANS:

QUESTION: Section 834 authorized one contracting activity in each military department and Defense Agency to utilize a test program under which prime contractors would be authorized to negotiate small and small disadvantaged business subcontracts plans on a company-wide basis. The test program will begin on October 1, 1990, and terminate on September 30, 1993. What is your timetable for issuance of proposed and final regulations?

ANSWER: The OSD Small Business Office developed a proposed "Test Program for Negotiation of Comprehensive Small Business Subcontracting Plans". The DFARS rule implementing the test program was published in the Federal Register on April 11, 1990 for public comment. We expect to issue a final DFARS rule in July.

13. DMR recommendations on the acquisition workforce

a. Question: The Packard Commission described the DoD acquisition workforce as "undertrained, underpaid, and inexperienced" compared to its industry counterpart. What specific steps does the Department propose to take in terms of training, compensation, recruitment, and retention of both military and civilian personnel for the acquisition workforce?

Answer: Improvement of the acquisition workforce is a key element of the Defense Management Report initiatives. We have established, within the Office of the Under Secretary of Defense (Acquisition), the Acquisition Education Training and Career Development Policy Office. This office is responsible for ensuring that policy and minimum mandatory standards for the education, training, recruitment, and career development of the acquisition workforce are established. In addition, as another DMR initiative, each of the Services is creating their Service Acquisition Corps which will be made up of military and civilian personnel who will be specially developed career acquisition specialists. In the areas of retention and compensation, we have submitted a package of DMR generated legislative initiatives and are working with OPM on their pay improvements package. Both these initiatives contain specific elements that are intended to improve the attractiveness of the civil service career.

b. The January 1990 DMR Implementation Progress Report, notes that each of the military departments "have developed plans to create dedicated corps of officers who will make acquisition a full-time career.

(1) Is there a schedule for implementation of these plans?

Answer: The Services are already implementing their plans for their Acquisition Corps. Some elements of the Corps were already in planning before the DMR was published and are fully or near fully in place. Other changes such as those that have been proposed for civilian career programs and the establishment of new training courses will take longer to implement. The administrative procedures for building the Corps should be completely worked out within a year to 18 months; the Services should have by then identified their key billets, and identified the initial military and civilian Corps members. It will take between four and six years to reach a "sustainment" point. The point beyond the building of the Corps and where we will be accessing personnel at normal yearly rates and the personnel that are accessed are attaining all the requisite training and education.

(2) What is the relationship between the Under Secretary of Defense for Acquisition and the Assistant Secretary of Defense (Force Management and Personnel) in terms of responsibility for supervision of these plans?

Answer: The USD(A) is chartered to "establish policies, in coordination with the Assistant Secretary of Defense (Force Management and Personnel) (ASD(FM&P)), for the training and career development of acquisition personnel." In this role the USD(A) acts as a functional proponent and establishes acquisition personnel unique policies within the overall DoD personnel policy structure that the ASD(FM&P) is responsible for. As such, primary DoD level responsibility for supervision of the Acquisition Corps implementation falls on the USD(A).

(3) What role, if any, will OSD have in terms of standardizing designation of positions that will be considered to be within the acquisition workforce, determining the composition of the acquisition corps, and minimizing differences among the services in their implementation of acquisition workforce reforms?

Answer: The USD(A) is the proponent for DoD Manual 5000.52M (draft), "Career Program for Acquisition Personnel," which establishes the job series and functions that are considered to be a part of the acquisition workforce. It is this document that brings standardization to the workforce. The Acquisition Corps were developed by each Service based on the broad guidance provided in the Defense Management Report. Within that guidance, each Service was purposely allowed to develop their corps to accommodate their unique structures and needs.

(4) The following questions concern the Acquisition Corps concept. To the extent the Department has not reached a decision on any of these matters, please indicate your timetable for action:

(a) What is the primary purpose of the Acquisition Corps concept?

Answer: To facilitate the development of a dedicated group of people who will make a full-time career as acquisition specialists.

(b) Which acquisition skills and career fields will be included in the Acquisition Corps and which, if any, will be excluded.?

Answer: The DMR specifically required that the Service Acquisition Corps would be designed to facilitate the development of experts in such distinct subspecialties as systems development, procurement and logistics. Beyond that guidance the Services were allowed to include other specialties as desired. None were specifically directed for exclusion.

(c) Will the Acquisition Corps include all persons in an acquisition career field (or having an acquisition skill) who

are performing full-time acquisition functions or will some be excluded?

Answer: The Services' acquisition corps are geared at having personnel in acquisition career fields eligible for Acquisition Corps selection primarily at the civilian GS/GM 13 level and 03/04 level for military. The number of personnel selected for the acquisition corps will depend on the number of Acquisition Corps billets identified in each Service.

(d) What will be the consequences in terms of compensation, training, and advancement for those who are not included in the acquisition corps?

Answer: Acquisition Corps personnel will have a carefully structured training and career development programs that qualify them for advancement into senior Acquisition Corps positions. At this juncture we don't anticipate that an Acquisition Corps person will be compensated differently than the rest of the workforce.

c. Last year, the Senate approved legislation that would have provided enhanced compensation for critical employees and limited waiver of dual compensation restrictions against military retirees. Although the Administration supported special pay for critical employees and authority to waive dual compensation restrictions, agreement on these provisions was not achieved in conference. Please describe the manner in which the Department could make use of these authorities to enhance the quality of the acquisition workforce.

Answer: The manner in which we would use such authority would depend largely on the numbers of positions that would be affected. We would have to evaluate our most critical skill shortages and determine where we would obtain the greatest benefit in terms of both recruitment and retention of quality personnel.

d. Last year, the Senate also approved legislation that would have authorized alternative personnel demonstration programs. How would the Department make use of alternative personnel authority to manage the acquisition workforce?

Answer: The Defense Management Report found that expanded demonstration authority, such as the China Lake initiative would be useful, but would not be enough to correct our personnel compensation problems. In that light we have worked with OPM in the development of their pay reform package that will affect the entire civil service system.

SASC Prehearing Questions

14. Defense Management Report Savings

The January 1990 implementation report states that savings will be attained in the amount of $2.3 billion in fiscal year 1991 and $39 billion over five years.

a. How much of these savings will be attributable to greater efficiency in current operations and how much will be attributable to reductions in force structure?

Answer: All of the savings come from improved operations. The improved operations fall into two broad categories: increased efficiency such as the elimination of duplicative over-head, and personnel reductions. For FY 1991 $350 million will be saved through personnel reductions and $1950 million will be saved through greater efficiency in current operations. The total savings for FY 1991-1995 will be $7.5 billion through personnel reductions and $31.5 billion through efficiencies.

b. What mechanism will be used to ensure that projected savings are actually realized?

Answer: The Directorate for Management Improvement, in the DoD Comptroller's office, will be monitoring the progress of Defense Management Report management actions and savings on a quarterly basis for both DoD-wide and Service-specific initiatives until all actions designed to achieve savings have been completed.

c. When do you plan to identify the sources for savings, as well as the timetable and milestones for achieving savings, for the balance of the DMR savings for the years after fiscal year 1991?

Answer: The first progress report from the Military Departments and Defense Agencies is due on May 15, 1990, for the quarter ending March 31, 1990. After receipt of these reports this summer, the timetable and milestones for achieving the savings will be identified.

15. DMR Progress Report

Question: When do you plan to make the next progress briefing on the implementation of the DMR recommendations?"

Answer: We plan to make our next progress report of the status of implementation of DMR recommendations later this year.

RESPONSE TO QUESTION 16

Q.16: Defense Contract Management Agency

The January 1990 report states that the contract administration functions, currently divided among the services and the Defense Logistics Agency (DLA), will be consolidated in a newly established organization to be known as the Defense Contract Management Agency that will house the DLA. It also projected savings of $1.1 billion over five years for contract administration services.

A.16: The January 1990 Progress Report on the Defense Management Report does provide for the consolidation of nearly all DoD Contract Administration Services (CAS) within DLA in the Defense Contract Management Command (DCMC). The Report, however, projects a savings of $255 million over five years and not $1.1 billion as stated in Question 16.

Q.16a: Are these savings entirely to be achieved through elimination of headquarters functions or will any of these savings be achieved through the elimination or reduction of specific contract administration functions? If the latter, which functions will be eliminated or reduced?

A.16a: These savings reflect a reduction in the number of intermediate Headquarters from 10 (9 DLA Regions and the Air Force Contract Management Division) to 5 Districts. It also reflects savings that will be realized from centralizing some functions; for example: property management, packaging, transportation, safety, and purchasing system reviews. These activities will be centralized in Districts or Area Operations. Savings will also be achieved by adopting the best practices of the Services and DLA in an effort to streamline all functions. Additional savings will be realized through the standardization of Plant Representative Offices. Some additional streamlining activities require Defense Acquisition Regulation cases which are being prepared and coordinated.

Q.16b: A December 1989, DoD IG report on the Department's annual Federal Managers Financial Integrity Act review stated that DoD should list contract administration as a high risk area that requires extra management attention in the future. What is the Department's position on the IG's recommendation?

A.16b: The Secretary concurred with the finding in general and has included the "high risk area" of contract administration in his 1989 Annual Statement of Assurance to the President and the Congress. The Statement of Assurance classifies contract administration as a departmental material weakness which insures that additional management attention will be applied. The 1989 Statement of Assurance identifies the following contract administration issues: (1) contract surveillance plans for cost-reimbursement contracts were not designed to evaluate contractor work accomplishments, work efficiency, and cost control measures; (2) contractor billings were approved for payment without adequate review or verification; (3) contracting officers were routinely approving other direct costs for payment without reviewing the reasonableness, allowability, or accuracy of the billings; (4) decisions to exercise option-year extensions were not supported by thorough reviews of cost

proposals or determinations of cost reasonableness; and (5) government furnished property was not adequately monitored and controlled.

Q.16c: In consolidating the contract administration functions in DCMA, what steps is DoD taking to ensure that the unique problems facing overseas contract administration activities are considered in the organization and operation of the newly established DCMA?

A.16c: During the formation and consolidation of contract administration into DCMC, we have been intensely aware of the unique problems facing overseas contract administration activities. As a result of these concerns Lieutenant General McCausland formed DCMC-International (INT) on 21 March 1990. DCMC-INT will provide oversight of overseas CAS and it will use the infrastructure of the Air Force Contract Maintenance Center (AFCMC), Wright Patterson AFB, Ohio. We have had a number of meetings with AFCMC and the Services to discuss concerns/problems, and additional meetings are currently scheduled to continue the dialogue with our overseas customers.

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17. Ethical standards in government and industry

Question: The January 1990 report notes that DoD establish a DoD Ethics Council to encourage industry participation in the voluntary disclosure program and the Contractor Risk Assessment Guide program. What actions, if any, have been taken or are planned to be taken by the Council to enhance industry participation in these programs?

Answer: The primary reason for establishing the Defense Ethics Council was to develop a Defense Ethics Program for DoD personnel, which has been done. As part of the program, the Department will work with industry to improve the ethical environment in the acquisition system.

Voluntary Compliance Programs. The principal voluntary compliance program is the Defense Industry Initiative on Business Ethics and Conduct (DII). The 200 largest defense contractors will be contacted asking those who are already DII participants to help obtain greater industry participation, and asking those companies that have not yet signed up to do so. The Under Secretary of Defense (Acquisition) recently met with representatives of the American Electronics Association, congratulating them on having over 400 of its members sign up to the AEA Ethics Code. Although this code does not specifically include a principle on voluntary compliance, the large number of signatories helps demonstrate that industry recognizes the importance of ethical conduct in the acquisition process.

Contact Risk Assessment Guide (CRAG). CRAG, a program developed jointly by DoD and industry, is designed to encourage contractor self-governance and reduce oversight. Eleven of the top 15 defense contractors are actively evaluating or implementing CRAG to varying degrees. To help encourage contractor participation in CRAG, DoD is committed to using available audit resources to: first, reduce the backlog of incurred cost and contract closeouts at CRAG contractors; second, to ship audit resources to non-CRAG locations. DoD and industry are now evaluating the program and developing case studies to demonstrate CRAG benefits and broaden industry participation.

18A. REGULATORY REFORM:

QUESTION: The January 1990 DMR Implementation Progress Report states that the Department has reviewed its internal directives and the DFARS with a view toward cancelling, combining, or revising the guidance as appropriate. The report, however, does not indicate what actions, if any, will be taken with respect to the FAR, which is issued by DoD in conjunction with GSA and NASA. What steps, if any, have been taken to review the FAR as part of the DMR regulatory review? What timetable, if any, has been established to implement any recommended changes?

ANSWER: The primary focus of the DMR is to streamline and reduce DoD-level issuances, which includes DoD Directives and Instructions, the Defense Supplement to the FAR, as well as Service/Agency and below supplements to the FAR. However, we are working with industry to identify major policies within the DFARS, as well as the FAR, that inhibit good business practices or do not add value. In addition, the Office of Federal Procurement Policy has begun a review of the FAR. This effort, which began in December 1989, is expected to require three years to complete.

18B. Regulatory Reform

QUESTION: The January 1990 report notes that a new set of acquisition directives and instructions will be issued by July 1990. Do you expect to meet that deadline? If not, what is your current timetable?

ANSWER: To date, we have identified over 200 DoD-level issuances for either cancellation and consolidation or revision and reissuance. Our intent is to streamline our internal regulatory system by writing regulations more clearly and in such a way that they can be implemented directly by operating levels without the need for substantive supplementation.

This is a significant effort, but we do still plan to have a new set of regulations developed and ready to enter the formal coordination process by July 1990.

18C. REGULATORY REFORM:

QUESTION: The report also states that a new DFARS will be published by February 1991. When will the proposed revision be published for public comment?

ANSWER: The new proposed DFARS will be published for public comment in August 1990.

18D. Regulatory Reform

QUESTION: The report further states that a task force will submit recommendations on key defense acquisition standards by April 1990 with recommendations due on the remaining body of specifications and standards by December 1990. What milestones and timetables have you established for action on these recommendations and issuance of revised specifications and standards?

ANSWER: Within the next month, we hope to have recommendations completed for the entire index of specifications and standards. By December 1990, we will have cancelled or inactivated for new design a significant number of specifications and standards. It is impossible to give you the actual number at this point because our review is still ongoing. In addition, by December 1990, we will have completed an action plan with detailed schedules for all revisions of specifications and standards. As detailed in the Regulatory Relief Task Force Report, implementation of these recommendations will proceed through calendar year 1992.

18E. Regulatory Reform

QUESTION: The January 1990 report also states that the Under Secretary of Defense (Acquisition) will develop recommendations to improve the process by which DoD-level documents are developed and issued. What is your timetable developing and implementing such recommendations?

ANSWER: In October 1989, the Deputy Secretary issued broad guidelines for the issuance of all future DoD acquisition regulations. These guidelines stressed the importance of giving our managers the necessary flexibility to exercise innovation and creativity in performing duties. The guidelines also emphasized that future regulations should only be written if they clearly add value to our fundamental mission, and also should be written in such a way that they can be implemented directly down to operating levels without the need for substantive supplementation.

We are now beginning an education and training program for the authors of our new revised issuances. This program will focus on structure, format, and writing style. In addition, we are developing new internal guidelines governing the process by which DoD-level documents are developed and issued. We hope to develop these procedures in concert with the training program and the ongoing regulatory relief effort so that the new process can become institutionalized.

18F. REGULATORY REFORM:

QUESTION: Do you expect any legislative initiatives to result from your regulatory review process? If so, what is your timetable for submission of a legislative proposal to Congress?

ANSWER: Secretary Cheney submitted a legislative proposal entitled the Defense Management Improvement Act on April 5, 1990. As we continue our regulatory reform actions, we expect other initiatives to develop. We hope to have a continuing dialogue with Congress on these matters.

18G. REGULATORY REFORM:

QUESTION: What is the relationship between the DMR's regulatory reform effort and the semiannual reviews by the Administrator of Federal Procurement Policy under 41 U.S.C. 421(g)?

ANSWER: OFPP has two programs to counter the trend toward over-regulation. The purpose of these programs is to (1) reduce the volume of new and existing procurement regulations, (2) assure uniformity, clarity and simplicity in those regulations deemed to be needed, and (3) reduce and, where possible, eliminate unnecessary paperwork burdens imposed on the Federal procurement community by regulation. Our DMR effort complements the OFPP effort in that we are eliminating regulations that are unnecessary or duplicative, inhibit good business practices, or do not add value. We then intend to rewrite the remainder of the regulations in plain simple English. We are taking the initiative a step further by seeking industry participation in this effort.

18H. REGULATORY REFORM:

QUESTION: The procedure for issuance and review of the FAR is governed primarily by 41 U.S.C. 421. What impact, if any, has this statute had on DoD's ability to prescribe and manage regulatory reforms in a timely and effective manner?

ANSWER: Our ability to prescribe and manage regulatory reforms in a timely and effective manner is hindered by the Federal Acquisition Regulatory process. It takes less than half the time for DoD to publish language for the Defense Supplement than it takes for a FAR rule which involves the participation of all the civilian agencies and OFPP. The FAR Council has overall direction and coordination responsibilities rather than day-to-day involvement in the rulemaking process.

18I. REGULATORY REFORM:

QUESTION: What mechanism has the Department established to meet the regulatory approval requirements of 41 U.S.C. 421(d)(1)?

ANSWER:

The Secretary of Defense, by memorandum dated July 22, 1989, delegated this approval authority to the Deputy Assistant Secretary of Defense for Procurement (DASD(P)). Under the direction of the Under Secretary of Defense for Acquisition, the DASD(P) must approve all procurement policies, regulations, procedures, clauses, or forms that have any effect beyond the internal operating procedures of the agency or have a significant cost or administrative impact on contractors or offerors. Contracting activities do not need DASD(P) approval on deviations from the FAR or DFARS that affect only proposed rules, one contract, or one-time use of nonstandard clauses.

19. Advocacy Reduction Task Force

QUESTION: The January 1990 report noted that the DMR Advocacy Reduction Task Force Interim Report recommended that 104 advocacy-related issuance be cancelled outright or cancelled and combined with other issuances. What is your schedule for completing action on the revision of the relevant issuances?

ANSWER: The recommendations of the Advocacy Reduction Task Force have been incorporated into our overall regulatory relief effort. To date, we have identified over 200 DoD-level issuances for either cancellation and consolidation or revision and reissuance. Our intent is to streamline our internal regulatory system by writing regulations more clearly and in such a way that they can be implemented directly by operating levels without the need for substantive supplementation.

This is a significant effort, but we do still plan to have a new set of regulations developed and ready to enter the formal coordination process by July 1990.

**20. Consolidation and streamlining study groups**

The January 1990 DMR Implementation Progress Report noted that study groups are investigating the possibilities for streamlining of supply and maintenance depots, inventory control points (ICPs), accountin operations, research laboratories and test facilities, and automated data processing operations. According the following responses are provided relative to the execution of these studies.

**Question 20a. Which office of the Secretary of Defense (OSD) office is responsible for supervising the work of these groups?**

**Answer:**

| Study Group | Office of Supervision |
|---|---|
| Supply, ICP and Maintenance Depots | ASD (P&L) |
| Accounting Operations | DoD Comptroller |
| Research Labs and Test Facilities | Dir, Defense Research & Engineering |
| Automated Data Processing Operations | DoD Comptroller |

**Question 20b. Does that Office have responsibility for selecting the membership, as well as directing and monitoring the work of these groups?**

**Answer:**

| Study Group | |
|---|---|
| Supply/ICP/Maint | No. Under the Consolidation Study Charter, the ASD(P&L) established a Consolidation Study Executive Review Group and Process Action Teams (PA The PAT, along with appointed "subject matter experts" from the Military Services, Comptroller, FM&P, PA&E and DLA were tasked to work cooperatively the four consolidation proposals. |
| Research Labs and Test Facilities | Yes |
| Acctg and ADP Operations | Each of the DoD Components was invited to appoint an appropriate representative to the study group. A representative of the DoD Comptroller was appointed chairman of the study group and expected to provide required direction to, and oversight of, the study group. |

**Question 20c. Which OSD offices will have primary responsibility for reviewing and analyzing work of these groups?**

**Answer:**

| Study Group | |
|---|---|
| Supply/ICP/Maint: | ASD(P&L) |
| Acctg and ADP Operations: | The DoD Comptroller has primary responsibility; however, the study including the recommendations will be coordinated within the Department prior to transmittal to DepSecDef. |
| Research Labs and Test Facilities | DDR&E |

**Question 20d. What is your timetable, if one has been developed, for identifying savings for the years beyond Fiscal Year 1991?**

**Answer:**

| Study Group | |
|---|---|
| Supply/ICP/Maint: | The Implementation Reports are due to the Deputy Secretary in early May 1990 for actions not requiring additional planning or data. Remaining outyear data will be developed during FY 1991 according to applicable implementation schedules. |
| Acctg and ADP Operations: | The Implementation Reports are due to the Deputy Secretary in early May 1990; however, it is too early to predict the amount of savings that might accrue to the Department. After the Deputy Secretary reviews the report and makes applicable decisions on its recommendations, an implementation plan will be developed. Once the implementation plan is developed, it will be more feasible to identify estimated savings by fiscal year. |
| Research Labs and Test Facilities: | The Implementation Reports for Test and Evaluation will be presented to the Deputy Secretary in early May. The Report for Research and Development Laboratories will be presented by early June. |

SASC Prehearing Questions

21. Personnel reductions and consultant services

The Defense Managment Report proposes substantial personnel reductions in acquisition and management positions. In the aftermath of the "Ill Wind" scandal, we learned that the Navy may have impaired its ability to manage the acquisition process by delegating significant functions to consultants.

a. What controls will be established to ensure that the reductions only apply to functions that can be eliminated without affecting essential management functions, and to further ensure that DoD components do not simply use contracted advisory and assistance services -- consultants -- to perform the same functions?

Answer: The Secretary's Defense Management Report (DMR) established a management framework for basic decisionmaking within the Department of Defense. This management framework was that: "(DoD) managers must be given a range of authority commensurate with their responsibility," and that "Subject to final decision by the President, the Secretary, or the Deputy Secretary, managers' participation in the process of establishing central policies should be encouraged."

In the area of Defense acquisition, this management framework has been implemented by establishment of a distinct and easily followed career acquisition command channel, consisting of "... an experienced, full-time Service Acquisition Executive (SAE), administering Service programs within policy guidance from the USD(A); through Program Executive Officers (PEOs), as key middle managers responsible to the SAEs for defined and limited groups of major programs; to individual Program Managers (PMs), vested with broad responsibility for and commensurate authority over major programs ...." After the Navy Department identified the potential problem that existed with consultants in policy-making positions, the Defense Department increased Navy hiring authorities to ensure that all policy-making positions were filled with military or civilian government employees.

The DMR also directed an increase in the level of professionalism of the military and civilian procurement workforces, with increased training and assurance of promotion potential for the most capable individuals.

All of these DMR proposals and independent actions ensure that essential DoD acquisition functions will be performed by trained, capable Defense Department military and civilian professionals and that contracted advisory and assistance services will be restricted to their proper advisory capacities.

21B. PERSONNEL REDUCTIONS AND CONSULTANT SERVICES:

QUESTION: Has the Department (including all applicable components) implemented the regulatory changes required by Section 8141 of Public Law 100-463 (regulating consultant's conflicts of interest)?

ANSWER: The DAR Council and the Civilian Agency Acquisition Council have agreed upon a proposed FAR rule, which will be forwarded to OFPP for review prior to publication in the Federal Register. The rule implements the provisions of the OFPP Policy Letter 89-1 dated December 8, 1989 on Conflict of Interest Policies Applicable to Consultants.

Question 22: Lobbying Restrictions

A) Has the Department (including all applicable components) implemented the regulatory changes required by 31 U.S.C. 1352 (as enacted in P.L. 101-121, restricting the use of appropriated funds to influence certain contracting and financial transactions)?

B) Has the Department encountered any implementation problems with respect to these regulations?

ANSWER:

A) The Office of Management and Budget (OMB) has issued interim guidance implementing the statute and the FAR has been changed to incorporate the OMB guidance.

B) The language of the statute is vague and unclear and OMB's guidance provides little help in determining what type of activity is and is not permitted under the statute. There is no way for contractors or government personnel to figure out what is legitimate selling and marketing activity and what is impermissible "lobbying."

The recordkeeping requirements are extremely burdensome for contractors who must file disclosure statements and update those statements. This burden extends to government personnel who must review these statements.

We anticipate significant accounting problems for contractors because of the inability to differentiate between appropriated funds and "non-appropriated" funds - the law does not prohibit lobbying with other than appropriated funds or with profit dollars - the problem is that contractors do not account separately for differing types of funds. Contractors will incur substantial costs in attempting to craft accounting procedures that will enable them to segregate profit dollars.

Contractors and many agencies, including DoD, believe that the statute has been interpreted too rigidly. One example of this is the issue of whether the requirement for disclosure statements applies to lower tier subcontractors. The current guidance requires this information from all subcontractors at any tier if they have subcontracts in excess of $100,000.

23. Defense Enterprise Programs.

a. What actions, if any, are being taken under the Defense Management Report to enhance the Department's utilization of the Defense Enterprise Program authority?

Answer: The OUSD(A) has had a senior level working group looking at the Defense Enterprise Program in light of our past experiences with the program and ongoing DoD initiatives to streamline the entire acquisition process. That working group is in the process of developing decision alternatives for the USD(A) to determine how we can best proceed.

b. What plans, if any, does the Department have to increase the number of Defense Enterprise Programs?

Answer: Shortly after the DMR was published we had asked the Services for new Defense major program DEP candidates that were high priority programs with stable funding and firm requirements. Since then, world events have caused us to re-examine many requirements and priorities. At the same time we have undergone major budgetary turmoil that has affected even the most stable and high priority programs. This budgetary turbulence has called into question the viability of virtually every proposed DEP candidate. Once the USD(A) decides on how to proceed with the program as a whole and some semblance of budget stability is achieved, new candidates would have to be sought.

c. For each Defense Enterprise Program, please describe the specific actions that have been taken since July 1, 1989 to address each of the following concerns:

(1) Enhanced program manager control over support staff and reduced reliance on matrix support.

(2) Use of regulatory relief authority.

(3) Revision of reporting and briefing requirements to ensure that designation of a program as a Defense Enterprise Program does not result in burdens greater than those imposed on non-enterprise programs.

(4) Budget requests that ensure stable funding.

Answer: No new DEP programs have been established subsequent to July 1, 1989. The OUSD(A) senior level working group that has been tasked to look at the DEP concept has each of these questions as an issue for resolution or recommendation.

d. Is there a need for legislative or regulatory changes to enhance the effectiveness of Defense Enterprise Programs? If so, what are your recommendations?

Answer: The DMR has generated considerable effort toward reduction of regulatory burdens on all programs and we are in the process of re-writing our basic DoD level acquisition documents (i.e.: DoD 5000.1 and DoDI 5000.2). As far as legislative changes are concerned, this is an issue that is being addressed by the DEP senior level working group.

Furthermore, one of the principal initiatives in the DMR legislative package is a proposed pilot program to conduct six major defense acquisition programs in the manner of commercial programs. It would enable DoD to waive, for those programs, any laws or regulations which do not apply to contracts to which the government is not a party. This would carry the concept of the DEPs to the logical conclusion of legal as well as regulatory relief.

24. MULTIPLE BEST AND FINAL OFFERS

QUESTION: In last year's report on the National Defense Authorization Act (S. Rep. 101-81), the Committee directed the Under Secretary of Defense for Acquisition to assess the Department's August 1988 regulation governing multiple best and final offers. What is your timetable for completing this assignment?

ANSWER:

Defense Federal Acquisition Regulation Supplement (DFARS) 215.611 was added in August 1988 to control the use of multiple BAFOs by requiring the Service Acquisition Executive or other senior level management personnel to approve requests for second or subsequent BAFOs. The Senate report requested our assessment of whether this regulation has discouraged the use of auction techniques, protected the integrity of the source selection process, and ensured that contracts are awarded fairly and promptly.

The report was submitted to Congress on April 9, 1990. We feel that this regulation has been effective. The increased control and monitoring of multiple BAFO requests has provided greater confidence in the integrity of the source selection process and helped streamline the award process. There were only 257 multiple BAFOs conducted in fiscal year 1989 under 57,036 competitive negotiated contracts awarded. We believe that the "Awards Without Discussions" initiative in Section 204 of the DMR legislative package is a necessary change to ensure that the use of BAFOs is minimized.

25. INTEGRATED FINANCING POLICY

QUESTION: 10 U.S.C. 2330 requires the Secretary of Defense to develop and keep current a plan that ensures that Department of Defense contractor financing policies are structured to meet the long-term needs of the Department of Defense for industrial resources and technological innovation. What is your timetable for completing this year's plan?

ANSWER: The initial version of the Integrated Financing Plan was submitted to Congress by the Secretary in November 1989. We do not anticipate any significant changes to the plan this year. We expect it will be completed by June 30.

26. Competitive Prototype Strategies

QUESTION: 10 U.S.C. 2365, the statutory provision governing competitive prototype strategies, will expire at the end of Fiscal Year 1991. What action, if any, is the Department taking to ensure that appropriate regulatory guidance for the use of competitive prototype stategies will be in place at the time that the statutory provision expires?

ANSWER: We are now in the process of revising DoD's top-level acquisition policy documents, DoD Directive 5000.1 and DoD Instruction 5000.2, in accordance with the Defense Management Report. These documents make provisions for the use of competitive prototyping strategies early in the development process. As currently drafted, of course, the documents make reference to the existing statute. Upon expiration of the statute, DoDD 5000.1 and DoDI 5000.2 will be in place to provide appropriate guidance.

27. MANDATORY UNCOMPENSATED OVERTIME

QUESTION: Section 804 of the National Defense Authorization Act for Fiscal Year 1989 requires the Department to establish criteria to ensure that proposals for contracts for professional and technical services are evaluated on a basis which does not encourage contractors to propose mandatory uncompensated overtime for professional and technical employees. (a) What actions have been undertaken to implement section 804? (b) What affect, if any, has this provision had in terms of impact on price or quality (or both) of professional and technical services acquired by the Department of Defense?

ANSWER: (a) As required by Section 804, a joint government-industry advisory committee was established to make recommendations on the criteria which the Department should use to ensure that proposals are evaluated on a basis which does not encourage contractors to propose uncompensated overtime. The committee submitted its report to the Under Secretary of Defense for Acquisition, who concurred with the committee's recommendation that a policy memorandum be issued and forwarded the report to the Committees on Armed Services on March 29, 1990. The policy memorandum has not yet been issued because Section 804 required congressional notification prior to the implementation of corrective action, although we expect to issue it shortly. It will: (1) stress the need for contracting officers to place appropriate emphasis on technical factors when evaluating proposals for complex professional and technical services, (2) direct the military departments and defense agencies to rescind policies which are not consistent with this approach, and (3) require offerors to disclose uncompensated overtime included in proposals and contracting officers to consider this factor in risk assessments.

(b) The advisory committee members agreed the issuance of the policy memorandum and associated regulatory revisions would result in meaningful improvements to the present contracting environment for professional and technical services, and we agree. The industry members of the advisory committee would have preferred that the Department evaluate all proposals for professional and technical services on a 40-hour work week basis; however, the Department would not agree with this recommendation because it could be considered a restraint of competition.

28. REGULATIONS ON USE OF FIXED-PRICE DEVELOPMENT CONTRACTS

QUESTION: Section 807 of the National Defense Authorization Act for Fiscal Year 1989 required the Department to revise regulations to restrict the use of fixed-price contracts in development programs.

a. What changes have been made to implement this provision?

b. Have these changes been incorporated in all relevant Departmental issuances, including those of subordinate components?

c. What implementing actions, if any, remain to be undertaken?

ANSWER:

a. DFARS 235.006(70) requires the contracting officer, and, in some cases, the Under Secretary of Defense for Acquisition, to determine in writing before contract award that the level of risk in a development effort is sufficiently low to permit use of firm-fixed-price type of contract for that effort.

b. Inclusion in the DFARS, which is circulated to all contracting activities within DoD, has provided sufficient publicity to this provision. There was no need, therefore, for including it in other, component-level issuances.

c. None.

29. DEFENSE ADVISORY PANEL ON GOVERNMENT-INDUSTRY RELATIONS

QUESTION: Section 808 of the National Defense Authorization Act for Fiscal Year 1989 required the Department to establish an Advisory Panel on Government-Industry Relations.

a. What actions has the Department taken to implement this provision?

b. What changes, if any, in acquisition policy have been made in response to the activities of the Panel?

ANSWER: a. The Defense Advisory Panel on Government-Industry Relations (DAPGIR) was formally established in March, 1989. It was composed of senior government officials, defense industry executives, and a noted academician, and chaired by the then Deputy Under Secretary of Defense (Acquisition). The Panel met regularly from March through September 1989, and conducted studies as required by Section 808. The Panel's findings, conclusions and recommendations are in the process of final review and coordination and will be submitted to the Secretary in the near future.

b. Since the Secretary has not received the report, we have not taken final actions to change acquisition policy as a result of the DAPGIR's activities. The DAPGIR report included proposed changes to the DoD FAR Supplement which would encourage the use of alternative dispute resolution procedures as well as provide guidance on its use. These proposed changes have been forwarded to the DAR Council for its consideration.

30. COORDINATION OF OVERSIGHT ACTIVITIES

QUESTION: 10 U.S.C 133(d)(1) requires the Under Secretary of Defense for Acquisition (USD(A)) to establish policies to prevent duplication of audit and oversight activities within the Department of Defense, including establishment of policies for coordination of the annual plans developed by the different elements in the Department.
(a) What specific actions have been undertaken to implement this section?
(b) What effect, if any, have these actions had on audit and oversight activities?

ANSWER: (a) The Department has attempted to eliminate as much duplication as possible by structuring audit/oversight responsibilities so that organizations are assigned specific responsibilities to perform specific types of audit/oversight reviews. A working group consisting of representatives from the offices of the Inspector General, Comptroller, and USD(A) was established to determine necessary corrective actions. A number of corrective actions have been taken, including:

o Requiring on-site government personnel to screen government visitors to contractor facilities;

o Increasing dollar thresholds for preaward reviews/audits;

o Redefining the respective roles of the contracting officer and the contract auditor;

o Requiring the preparation of annual review/audit plans for contractor facilities;

o Emphasizing the use of limited scope audits where appropriate;

o Assigning the responsibility for performing contractor compensation reviews to one agency within DoD and the responsibility for negotiating interim billing and final overhead rates to contracting officers;

o Designating the DASD(Procurement) as the official responsible for reviewing all regulations and policies which have any cost or administra-

tive impact on contractors to ensure that audit/oversight responsibilities are appropriately structured to minimize the potential for duplication; and

o Designating the DASD(Procurement) as the focal point for resolving allegations of duplication.

(b) We believe audit and oversight activities are now structured in the manner necessary to minimize any duplication. The DASD(P) has not received any specific complaints of duplicative audit/oversight reviews from industry in the past six months.

31. SEVERANCE PAY

QUESTION: Prior to 1987, severance pay for the termination of foreign nationals working on U.S. Service contracts was treated as an allowable cost. 10 U.S.C. 2324(e)(1)(M), which was enacted in 1988, provides that severance pay to a foreign national above the level normally paid to a similar worker in the U.S. is not an unallowable [sic] cost. What impact has this had on contracting and the costs of U.S. Service contracts?

ANSWER: Implementation of the provision (10 U.S.C. 2324(e)(1)(M)) limiting the allowability of severance pay for foreign nationals was incorporated in Federal Acquisition Regulation (FAR) sections 31.205-6, 37.110(f), and 52.237-8 on April 28, 1989. The full impact of this provision will not be known until contracts awarded with the severance pay provision are completed or terminated. Data on such contracts are not yet available to ascertain the impact of this provision on contracting for services overseas or on the costs of such contracts.

However, we anticipate that this legislation will impact service contracts overseas in several ways. First, since service contractors overseas are required to pay severance pay in accordance with local laws, contractors may have to pay more severance pay than will be allowable under the severance pay provision. Under these circumstances, contractors are likely to propose higher profits to make up for the additional risk they are assuming concerning unallowable severance payments. Another potential impact may be reduced competition for DoD service contracts overseas because of contractors' concerns with the additional risk that they would assume.

32. WITHHOLDING OF PAYMENTS IN CONTRACTS TAINTED WITH FRAUD

QUESTION: In a hearing before the Subcommittee on March 21, the Inspector General noted that there is virtually no regulatory guidance concerning withholding of payments on contracts tainted with fraud, and she noted that she has submitted a proposed change to the DFARS to provide such guidance. What is the status of this recommendation?

ANSWER: The specific recommendation made by the Inspector General (IG) was that the USD(A) should include a clause in all contracts to prohibit a contracting officer from making progress payments based upon substantial evidence that any contractor progress payment request is fraudulent. The USD(A) and the IG are discussing whether such a clause is necessary since the Department already has the right to withhold payment in any situation where a contractor has inappropriately included amounts in a progress payment request, whether due to fraudulent intent or an honest mistake.

33. COORDINATION OF FRAUD INFORMATION AND REMEDIES

QUESTION: The IG also testified that one of the early lessons learned from procurement fraud investigations was "the need to ensure that information developed during the [procurement fraud] investigation was made available for noncriminal purposes." She also noted that DoD's current guidance on the subject has assisted in applying the appropriate administrative, civil, contractual, or criminal remedies but significant improvements are still possible.

Do you agree with these observations? If so, what changes are planned in DoD policies and procedures regarding coordination of fraud information and remedies?

ANSWER: Last year the Department issued an updated version of DoD Directive 7050.5, "Coordination of Remedies for Fraud and Corruption related to Procurement Activities." Responsibility for this Directive and the policies it established falls under the DoD IG. We agree with the IG that we must coordinate actions as early as possible in an investigation and take action against contractors or individuals when warranted. We understand that the IG has no current plans to change the policies and procedures now in use regarding coordination of fraud information and remedies.

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34. PROCUREMENT FROM A SPECIFIED SOURCE OVERSEAS

QUESTION: Please describe the statutory and regulatory procedures under the Competition in Contracting Act that are used when U.S. forces overseas procure goods or services from a local source and the law of the host country requires procurement from a specified source.

ANSWER: Federal Acquisition Regulation (FAR) Subpart 6.3 prescribes policies and procedures, and identifies the statutory authorities, for contracting from a specified source overseas. The authority of FAR 6.302-1 (10 U.S.C. 2304(c)(1)) applies to procurement of goods or services overseas if the law of the host country requires procurement from a specified source. An example would be the procurement of utility services in Europe which are typically available from only one government entity.

One exception to the use of the authority of FAR 6.302-1 for the circumstances identified in the question, would be if the requirement of the laws of the host country to procure from a specified source has been incorporated into an international agreement or treaty. FAR 6.302-4 (10 U.S.C. 2304 (c)(4)) would apply to this situation. Under this authority, a document must be prepared by the head of the contracting activity that describes the terms of the agreement or treaty that require the use of other than competitive procedures and such document must be approved by the competition advocate of the procuring activity (10 U.S.C. 2304(f)).

There are provisions contained in various international agreements, such as host nation support agreements, that require the United States to contract for certain supplies or services from a host government entity. These provisions are sometimes required by local law. In this situation, the head of the contracting activity must prepare a document describing the terms of the agreement that require contracting with a particular source and the document must be approved by the competition advocate of the activity.

35. Contractor past performance

Question: The Report of the Senate Armed Services Committee accompanying the National Defense Authorization Act for Fiscal Years 1990 and 1991 (S. Rep. 101-81) requested the Under Secretary of Defense for Acquisition to evaluate the effectiveness of initiatives emphasizing contractor past performance in the evaluation process. What is the status of this report?

Answer: In 1989 the Under Secretary of Defense for Acquisition established a joint OSD-Component task force to evaluate current Component programs for using contractor past performance data in source selections. The task force's review found that contractor past performance data exists in, and is being used in source selection decisions by, the DoD Components. However, the task force also found that such usage is not as widespread nor as consistent as it should be. In order to improve the situation, the Department is in the process of establishing a Past Performance Coordinating Council composed of representatives of OSD and the Components. This body will oversee the process of making the information on past performance that exists within each DoD Component more readily available to the others, and of ensuring greater consistency among the Components in applying past performance data in contract award decisions.

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